STEEL
The Weekly Magazine of Metalworking

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THIS WEEK IN METALWORKING

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***Next Week*... Metal Bonding Makes Strong, Smooth Assemblies ... Stainless Fabricating Methods Successfully Form Titanium Sheet ... Cleaning Costs Blasted with Air Conditioned Cab ... RF Heating Pays Off in Components Production**

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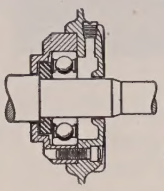

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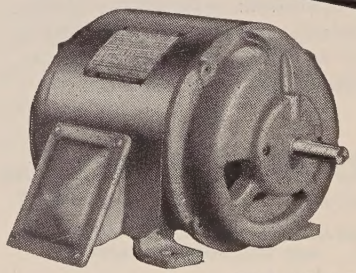

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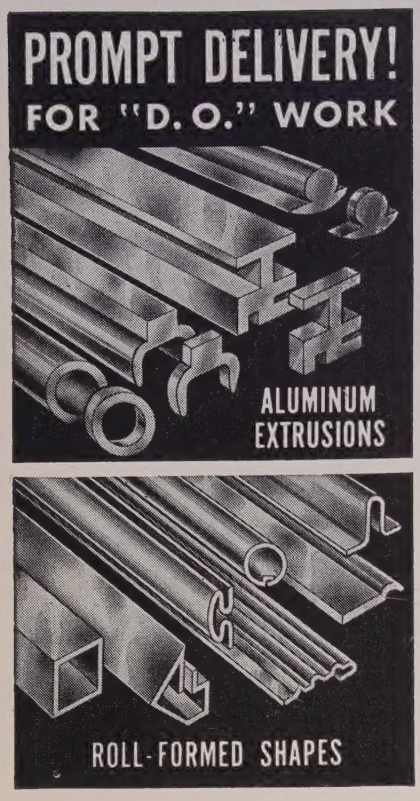

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Behind the Scenes..

Word Marathon

In our marathon to find the longest word in the English language, more suggestions flow in. None surpasses the 45-letter jawbreaker submitted by J. W. Caum of American Society for Testing Materials (we're not going to reprint it; look it up in the Dec. 3 issue), but a 36-letter one has just come in that's one of the most appropriate we've seen. It's hyperpolysyllabicsesquipedalianistic. The word refers to someone who is addicted to the use of long words and is submitted by L. L. Peck of Reynolds Ship Repair Inc.

While we're on the subject of words, we'd like to mention that we're hunting for a good substitute for "yearbook" in connection with our annual issue that comes out next Jan. 7. We wrote for advice to Dr. J. E. Schmidt, the Baltimore doctor whose hobby is words. He suggests enchiridion or vade mecum. Enchiridion means handbook or manual. Vade mecum means a book or something that goes with a person as a constant companion. Since our yearbook will be far more than a manual and will be much to big to carry around as a constant companion, we're still hunting for a synonym.

George Washington Wrote Here

We heard somewhere that George Washington's signature, written in pencil, weighs 0.00089 grams. We know that scales exist to weigh to such accuracy, but what we can't figure out is how the signature alone can be disembodied from the paper on which it is written and then weighed.

Some of you scientists may write in to explain the mystery.

O.K., with Changes

The other day we ran across a jingle, author unknown, which we dedicate to our friends, the artists. It expresses what many of them are too polite to put vocally:

I dread to take a picture
To the man who wants to change things;
Who says, "That's fine, just what I want,
But let us rearrange things.
Let's move the building over,
And give the man a cane,
And add an umbrella,
Just in case it starts to rain.
And change the girl's expression
To one of glad surprise.
If it ain't too damn much trouble
Change the color of her eyes.
Don't clutter up the picture
With meaningless detail
But get a dock in somewhere
With a boat about to sail.
I suggest a troop of soldiers
And a fat man with the gout,
Also a railroad station
With the train just pulling out.
The man is running for the train
And fears he may be late;
So have him looking at his watch
With hands at halfpast eight.
Don't let the thing get crowded,
We must have room for copy—
But give the girl galoshes
Because the weather's sloppy.
And make the oak a maple,
And make the horse a cow,
And make the hen a rooster
And make the rake a plow.
With these few minor changes
Everything's O.K.
We're much behind our deadline,
Please finish it today."

New Man

A new man we didn't recognize was up on the ninth floor the other day, so we made discreet inquiries and learned that Bob Hall is the chap's name and that he's a new assistant editor.

Bob will specialize in production and engineering news for STEEL. He comes from Cleveland Electric Illuminating Co. where one of his jobs was to help put out *Electrical Production,* CEI's excellent external house organ. He's a graduate of Western Reserve University and is unmarried.

Puzzle Corner

Our face is red. We had received when we went to press 41 letters and cards regarding the chipmunk puzzle of Nov. 26, and there are 38 different answers.

Normally our little black book would resolve the question immediately, but even that fails us. The page on which that answer should nave appeared is all chewed up, by mice or maybe chipmunks, and we can't figure out what the solution is. We will reveal this: Three puzzle addicts say the answer is 51 feet. Two say it's 70 feet. Those in favor of 51 feet are T. S. Bean of Barber & Ross Co., Charles Jennings of Allen Steel Co. and J. F. Findlay of El Potosi Mining Co. The advocates of 70 feet are George Brumfield of Olson Engr. Co. and Ralph Pappenheimer of Specialty Device Co.

If a man 6 feet tall walks around the equator, how much farther would his head travel than his feet?

Shrdlu

(Metlaworking Outlook—Page 51)

STEEL

The Metalworking Outlook

December 10, 1951

On the Fire: Order Changes

Watch for some new directives now being mulled over by NPA that will affect steel users. One ruling would set up a formula to govern changes in mill rolling schedules. Another on the fire would set up production directive to cover conversion steel and stop some of the shenanigans suspected in that activity. A third would set new mandatory periods for pre-lead time bookings. That period is now 45 days for general carbon products.

Who's Right?

A Munitions Board report on prime contracting in fiscal 1951 shows that General Motors Corp. received $2,372,500,000 in government orders, but a Senate Small Business Committee report says that GM was awarded $3.5 billion in the first 11 months of fiscal 1951. Who's right? Whatever the correct total, the size is alarming to Small Defense Plants Administrator Telford Taylor who is campaigning among procurement agencies for joint action to spread defense contracts. He wants an analysis of the overall procurement program, a determination of small business' fair proportion and co-ordination of existing inventories of small business productive facilities.

Mr. Tobin Steps In

Some defense contracts have been let to big companies—especially in the Detroit area—after pressure from the Labor Department which is alarmed at unemployment among industries cut back by the defense program. That's why the GMs, Chryslers and Fords have won so many of the primes. The influence brought to bear on Labor Secretary Maurice Tobin comes from unions, not companies.

More Machine Tool Subcontracting

Machine tool subcontracting gains. Cincinnati Milling Machine Co. says "a large volume of our business is being subcontracted." About 25 per cent of Warner & Swasey Co.'s monthly business is subcontracted. Around 25 per cent of Bullard Co.'s 1951 output will be attributable to subcontracting. E. W. Bliss Co. expects subcontracting to help its 1952 production. Subcontracting probably will account for "at least 35 per cent" of Niles-Bement-Pond Co.'s 1952 machine tool output.

A Matter of Reconversion

Reconversion from oil to coal may be necessary for some companies. C. E. Davis, director of the Refining Division of the Petroleum Administration for Defense, says that's the outlook in case the tempo of war picks up. The yield of fuel oil for heating, once 25 per cent of all the crude oil processed, has declined since the war because petroleum companies find it more economical to refine higher-grade products. If

Production-Engineering News—p. 87 The Market Outlook—p. 155

allout war develops, more fuel oil would be needed by the military, and civilian users would be out of luck.

Where Do We Stop?

More and more men in industry are considering the questions: What will we do with all our defense capacity if no allout war develops? Where and when do we stop on industrial mobilization? The General Electric Co. chairman, Philip D. Reed, touched on those matters when he said: "It is my considered view that the peak of the rearmament program as presently projected is too high and that it comes too soon."

Forecast for Food

Farm crop production in 1952 is expected to be 50 per cent above the 1935-1939 average by the Department of Agriculture which is alarmed about the drop in farm machinery output, now below the 1949 level. Especially needed are cotton pickers, crawler tractors and various other specialized machines.

Big Threat: Holiday Absenteeism

What are you doing about plant operations on Dec. 24 and Dec. 31? Those days before Christmas and New Year fall on Mondays this year and if you do work, absenteeism may be unprecedentedly high. A survey of 100 companies reveals that 20 will work both Dec. 24 and Dec. 31, 12 will close both days, 12 will close on Dec. 24 but open on Dec. 31, 40 per cent are still undecided, the rest will keep on part of their forces both days for inventorying.

Straws in the Wind

Fourth contender in the light-weight auto field, along with Kaiser's Henry J, Nash's Rambler and Willys' Aero Wing, may be one by Hudson . . . The International Materials Conference is trying to set up world prices and allocations of tungsten . . . DPA will undertake to screen idle production facilities valued at $1 million or more and bring them to the attention of military procurement officials . . . There's no point to talk about decontrol of prices, thinks Mike DiSalle—not as long as we still have a big unsatisfied defense demand . . . Strong candidate for entry into primary aluminum production is Olin Industries; Department of Interior is still delaying a decision on Anaconda Copper-Harvey Machine's proposal at Kalispell, Mont. . . . U.S. Steel Co. may have to pull out its No. 3 open hearth and related mills at the Homestead Works within eight or ten years because Allegheny county, Pennsylvania, has allegedly over-assessed the U.S. Steel property by $44 million.

What Industry Is Doing

Structural steel will be a limiting factor on industrial construction and machinery building until late next year (p. 59) . . . Stran-Steel Division of Great Lakes Steel has an adaptation of the Quonset building (p. 60) . . . Most steelmen want to end controls; the only question is when (p. 61) . . . A full-swing nonferrous scrap drive will be underway by Jan. 1 (p. 62) . . . Steel companies are faced with demands for company-wide wage contracts (p. 63) . . . Crane Co. is stepping into the aircraft business (p. 64) . . . Two interim regulations should help clarify renegotiation for government contractors (p. 65).

The Real Ogre

One of the many ways in which the present administration in Washington tries to keep alive its running-fire attack on "big business" is to proclaim that the "bigs" are getting bigger and that the smalls are suffering the fate of being swallowed up by giants. In almost every utterance by Washington on this subject, it is implied that the smaller outfits are swallowed against their will.

As a result of this type of propaganda, so many agencies have been created in Washington to "protect" the interests of small business that these agencies find it difficult to keep from treading on each other's toes. While it is possible that one or more of these well-intentioned bureaus may afford some assistance to companies of modest size, none of them is tackling the problem realistically.

This is because Washington's picture of the plight of little business is distorted and phony. In the first place, it is not true that business is being concentrated in fewer big corporations. A study just completed by Prof. M. A. Adelman, Massachusetts Institute of Technology, published in "The Review of Economics and Statistics," indicates that "the extent of concentration shows no tendency to grow and it may possibly be declining."

The second distortion has to do with the "swallowing up" process. Do the big corporations prey on the small? Recently we heard the head of a large corporation say that he is approached several times a week by owners of small businesses in his field who wish to sell out to his corporation. "We have to be hard-boiled in our selections. We can take over only the occasional concern that really fits into our picture."

Of course, as most readers of this page know, owners of these small businesses are forced to sell by the impact of exorbitant taxes. They have to turn the results of their life's work into cash to put their estates in order taxwise before they die.

The real ogre of small business is not predatory big business. It is the unreasonable tax system which penalizes efficiency, success and thrift.

E. L. Shaner

EDITOR-IN-CHIEF

AGENCIES "PAD" NEEDS: If you believe the "stated requirements" of the claimant agencies for fourth quarter of 1951 and first quarter of 1952, you must accept the dubious assertion that current demand for heavy structural shapes is at the annual rate of 11.5 million tons. In 1942, at the peak of World War II construction, output of heavy shapes

was 4,943,000 tons, the record until this year. In 1951, shipments will be close to 5,200,000 tons. Does this make sense?

Demand as indicated by the requests of claimant agencies is inflated drastically. In recognition of this fact, a 7-man staff is being organized to check structural projects as to quantity and timing, and to cut requests down to reasonable proportions before they are presented to DPA's requirements committee. If this plan is followed intelligently, it will sweep a lot of froth from claimant agency requests. The claimant agency device encourages generous padding of requirements. —p. 59

* * *

HOW TO BRING OUT IDEAS? Are the metalworking industries utilizing the idea power of their employees to full extent? R. E. Roberts, manager of employee relations of Ford Motor Co., thinks not. He says that only 5 per cent of the workers in the United States are included in suggestion systems. From this he infers that "the ideas of nearly 95 per cent of America's work force are being wasted."

Mr. Roberts certainly is on safe ground in emphasizing the fact that many ideas of employees never come to the attention of management, but some industrial employers will raise the question as to whether or not a formal suggestion system is the sole method of eliciting usable ideas from employees. Carefully supervised suggestion programs have worked well for many companies—particularly large ones. At the same time, some of the most valuable contributions to American know-how have come from workers in shops where no formal system was in use. —p. 69

* * *

TRADE STATUS DIFFERS: Brief year-end summaries of industrial and economic conditions in Sweden and Italy show interesting contrasts. Sweden is enjoying marked activity resulting largely from world rearmament programs. Although she faces problems in connection with her five-year-industrial plan, currently she is benefiting from the fact world prices she receives for her exports are going up faster than the cost of materials going into these products.

Italy also is expanding in industry and agriculture, but high costs and limited finances are serious hindrances. Also she is forced to import considerably more than she has been able to export. This results in an unfavorable trade balance which further complicates the financial problems. Italy will continue to need assistance from the United States in 1952.

—pp. 70, 71

* * *

TOOL CRIB DIVIDENDS: Every plant in the metalworking industry has a tool crib or its equivalent. Usually it is a caged area where drills, gages, templates and numerous other items are issued to workers on orders or checks.

In a large establishment the control of large numbers of tools requires systematic procedures. In the case of the Glenn L. Martin Co., airplane builder in Baltimore, Harry George, chief of tool control, has to keep track of 250,000 separate production tools and 7000 categories of general purpose tools which total 2,500,000 in number.

Identifying, storing and issuing these tools constitutes a sizable chore, but beyond these basic considerations are opportunities for the tool control personnel to save a lot of money. It can help the purchasing agents to buy advantageously, preserve tools against corrosion and surface damage, inaugurate cost-important salvage operations and introduce training methods aimed at reducing the loss incurred through broken tools.

Never underestimate the cost-saving potentials of the tool crib! —p. 92

* * *

EFFICIENT USE OF HEAT: In the first of a series of articles to appear in this publication, Charles E. Agnew, consultant on blast furnace and sintering plant operations, makes a strong case for a more intensive study of the thermal economy of our ironmaking facilities.

He points out that in recent years, the price of coke has advanced more rapidly than that of iron ore. It is certain that costs of both will continue to increase because of the necessity of beneficiating low grade ores and coal to replace the diminishing supply of high grade materials. This higher cost of ore and fuel will increase the importance of heat conservation and the efficient application of it to the work it must do.

Blast furnace operators who recognize this new importance of thermal economy early and who accept its challenge intelligently will have a decided advantage over competitors in the cost of producing pig iron. —p. 102

Structurals: Enough Backbone?

Paradoxically, the more available, the more needed. The shortage—which may ease by late 1952—is a chief limiting factor for construction and machinery

Structural steel is the real backbone of the construction industry, both because of its use in buildings and other structures and because of its essentiality in construction equipment. The shortage of the material is partly psychological, partly real. The psychological problems may clear up by late 1952

STRUCTURAL STEEL, the backbone for much construction and machinery building, will continue to be hard to get and a limiting factor in those activities well into 1952.

But the whole supply situation should shake itself out by the third or fourth quarter of next year. Men who know structural steel best say the shortage is partly psychological. If, like structurals, butter would become rationed tomorrow, a shortage would develop next week, even if supplies until then had been fairly good. The psychological aspects, at least, of the steel scarcity are expected to be less serious by late in 1952.

The Whys and Wherefores—Something's odd in the structurals situation today. Here's why: Stated structural requirements for all end uses based on this and next quarter requests approximate an annual rate of 11.5 million tons. Even in 1942, a big consumption year when the nation was building a World War II industrial plant, shipments of heavy structurals hit only 4,943,000 tons. Estimated shipments this year to fabricators and other consumers will be 5.2 million tons.

Distribution of structurals under any system of controls is admittedly difficult, more so than for most steel products because of an extended chain of procurement—through architect, engineer, general contractor, structural mill and fabricator. To help overcome that drawback, a seven-man staff has been formed to co-operate with the Defense Production Administration. It's charged with the responsibility of examining the status of construction projects included in stated requirements of each claimant agency. It will determine whether those requests are realistic as to quantity and timing.

The Members—On the staff are: Howard Mullen, U. S. Steel Co.; Herbert J. Hess, Bethlehem Steel Co.; James B. Steep, structural engineer, Detroit; James Hamilton, American Bridge Co.; Robert E. Wilmot, Bethlehem Steel Co.; Henry J. Stetina, American Institute of Steel Construction; and Gordon W. L. Galloway, Austin Co.

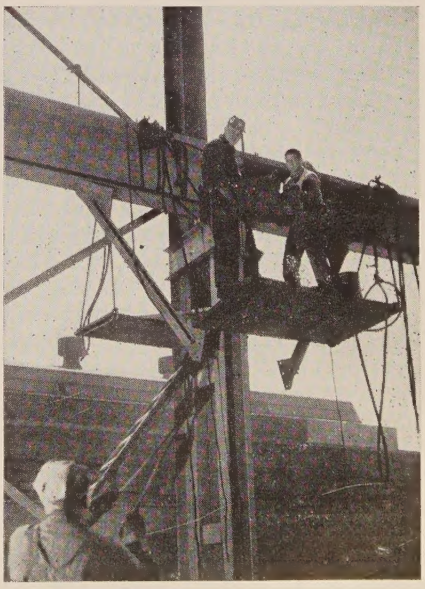
That group will attempt to forestall a repetition of the situation where next quarter structural allotments for many claimant agencies had to be reduced 50 per cent. The construction industry suffered about the least from those curtailments. It won allotments for next quarter—for its fabricating shops—of about 900,000 tons out of an estimated supply of 1,425,000 tons, slightly more than for this quarter when the take is 890,000 tons from a total supply of 1,320,000 tons. The record quarterly shipments of fabricated heavy structurals for construction reached 640,000 tons in the second period of this year. The structural fabricating shops say they needed about 1.4 million tons this quarter. If so, they would fabricate more than twice the tonnage they handled in the record second three months of 1951.

Mystery—A minor puzzle in construction today is the unexpectedly slight total effect government curbs on heavy building have thus far had. Where bridge, church, school and hospital programs have been shelved, more than compensating industrial jobs have taken their places. Shipments by the structural fabricating industry this year are expected to reach 2,780,000 tons, compared with 2,275,885 tons in 1950. The tonnage in 1952 bids to surpass the 1951 performance. While monthly new orders have declined lately—especially since last August when severe construction curbs came out—the backlog is now at 2,640,851 tons, the largest in the industry's history.

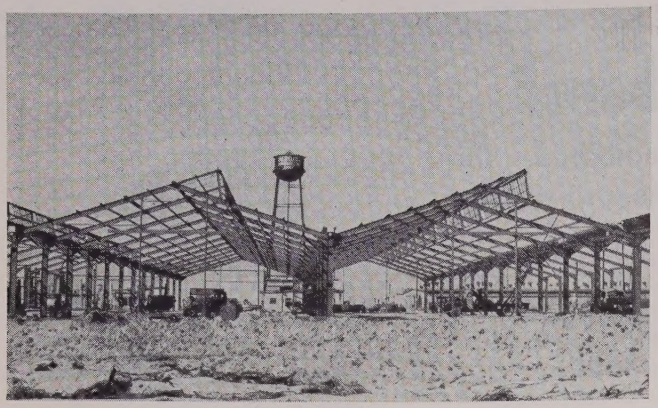
A limitation order on construction came out during World War II in April, 1942. In less than five months the impact was sharp. Fabricated structural shipments, from 600,000 tons in the second quarter of 1942, fell steadily beginning in October that year and finally reached 170,000 tons per quarter in 1944.

Different Story—Although allotments to structural steel fabricators are relatively high, the construction equipment builders received different treatment. They asked for 82,275 tons of steel for next quarter, got only 30,000 tons or 36.5 per cent. Crane manufacturers, especially, will be hard hit by the curtailments, because that type of equipment is needed for the steel mill expansions. They have petitioned NPA for assistance. Next quarter's output of construction machinery will generally be on about the same level as in this three-month period. NPA says that CMP has kept production of motor

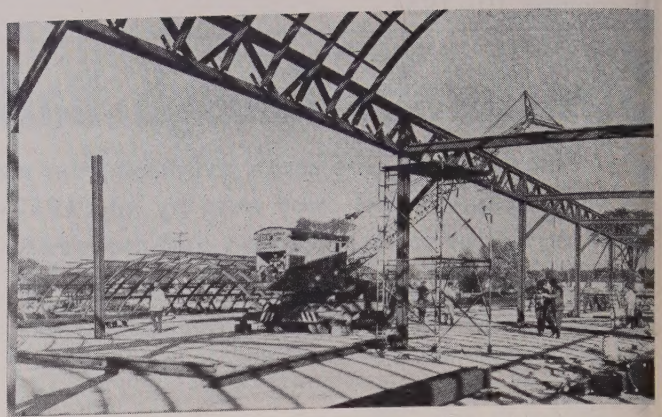
FOR U.S. STEEL'S FAIRLESS WORKS
. . . giant girders from American Bridge



REPUBLIC'S CLEVELAND EXPANSION
. . . perfect control on a white hot pitch



PRIVATE CONSTRUCTION TAKES A BIG STRUCTURAL BITE
. . . Aerojet Engineering building in California



QUONSET LONG-SPAN MULTIPLE ARCH BUILDING
. . . for Nash-Kelvinator from Great Lakes Steel

graders at the 1950 level. Manufacturers report their inability to place from 5 to 50 per cent of fourth quarter CMP authorizations on steel mill schedules.

Many construction machinery manufacturers argue that a continuation of fourth-quarter 1951 production levels in 1952 will not be enough, partly because the impact of the $5.5 billion military construction program will be felt by midyear. Orders resulting from the program will become heavy next summer as private construction contractors, with the military orders in their pockets, will start a stampede to buy equipment.

The Key—Structural steel's availability holds the key to whether you'll get your new plant or addition done on schedule. Supplies for construction jobs promise to be a little easier by late next year, but you can't win. By that time a shortage of construction machinery may be a serious limiting factor.

Quonset-Type Building May Aid Construction

TROUBLED with getting structural steel for that new building you're planning?

Stran-Steel Division of Great Lakes Steel Corp., Ecorse, Mich., has a solution. It is an adaptation of the Quonset building and is erected without using hot-rolled structural steel. All structural members in what Stran-Steel calls its "Long-Span" multiple arch building are of NAX high tensile cold-formed strip steel.

Springing Up—Closest to completion of the buildings using the Long-Span method of construction is a 62,000 square foot parts warehouse at Nash - Kelvinator's Milwaukee plant. This building is four bays wide —approximately 180 feet—at one end. In its longest portion, two bays wide, it extends 480 feet. Now five-sixths finished with corrugated galvanized steel walls and roofing applied and in use by Nash for storing automobile replacement parts, the structure was begun only 45 working days ago by a 16-man crew. At A. O. Smith Corp. in the same city two of the structures containing 17,000 square feet each are being put up. Five buildings, totaling 220,000 square feet, are to be erected for Boeing at its Wichita (Kans.) Division plant. And in Elmira, N. Y., a 34,000 square foot job is scheduled.

The Stran-Steel structure is designed along the modular principle. Each bay is 35½ feet center-to-center of columns in width by 40 feet center-to-center of columns in length. Minimum building size is two bays wide by two bays long. Any width and length of buildings is possible by adding increments of 35½ feet in one direction and 40 feet in the other. All materials required for the structure are factory-fabricated, prepunched where required for bolts and metals screws, and shipped ready for erection. The galvanized sheeting (and insulating material, if desired) is attached to the roof purlins and side columns by nailing.

Similar to Quonsets—In many respects manufacture and erection of the Long-Span buildings is identical with that of Quonsets. The arch roof uses the same rib section, rib splice, purlins and solid bridging. Instead of a three-segmented rib which the Quonset requires for its sides and roof arc, however, the Long-Span roof comprises only two segments.

National Production Administration, through its local offices, has given Stran-Steel Division almost complete say-so as to the purposes to which these buildings may be put. None of the present or contemplated installations has required NPA authorization. Within the limit of their own steel allocation Stran-Steel is providing the units to their dealers for sales and erection. No estimate can be made on costs by the manufacturer because variations in labor rates and in types of workers needed for the job make a dollar-per-square-foot estimate impossible, say Stran-Steel.

Not Sold on Prestressed Beam

The prestressed concrete beam—that development in construction which has caused such a furore—isn't likely to push the conventional steel beam out of buildings and bridges of the future.

Take that from W. D. Moorehead, chief sales engineer for a Youngstown industrial firm and a recognized expert on structural steel and reinforced concrete construction. He thinks there are still too many problems remaining to be solved until the new type construction can come into universal use.

Austin Co., Cleveland, industrial construction firm, recently caused quite a stir in construction circles when it used some 60-foot pre-stressed concrete beams in building an addition for the F. W. Wakefield Brass Co. at Vermilion, O. It gave a lot of hope to those firms trying to get structural steels for new buildings.

Mr. Moorehead feels that much more study and research will be necessary on prestressed concrete beams in bridge and building construction to make sure that it will do the job intended for it, also that it will stand up permanently. He thinks there are many problems of economy and safety to be solved.

Supertanker Order To Bethlehem

Bethlehem Steel Co.'s Quincy yard will build four new supertankers costing an estimated $25 million. Contracts for two of the tankers was awarded by Orion Shipping & Trading Co., New York.

Controls: The $64 Question, Plus Tax

Most steelmen want to end controls, but the question is when. Sentner, U. S. Steel official with NPA experience, cautions against "precipitous" action

TO CONTROL, or not to control, that is the question.

The problem is uppermost in the minds of steel executives, and they've been sounding off about it—before Sen. Blair Moody (Dem., Mich.) and his small business subcommittee and at various trade group meetings.

A Matter of Timing—Most steelmen want the end of steel and other controls, but the question is when. J. V. Honeycutt, assistant vice president for sales of Bethlehem Steel Co. implied in testimony before Senator Moody's group that he wants an end of CMP now. Richard F. Sentner, assistant executive vice president of U. S. Steel Co. who once served as director of NPA's Iron & Steel Division, also favors decontrols but cautions that "a precipitous swing from full controls to the other extreme at this time could easily result in further confusion."

He spoke before a Cincinnati meeting of the Institute of Cooking & Heat Appliance Manufacturers. "For our economic survival," he believes, "the present controls must be terminated at the earliest possible moment. The steel industry is better qualified to do the job faster, at lower cost, more efficiently and with less confusion."

Spadework—Mr. Sentner wants to develop an interim program that would eventually enable us to shed controls with a minimum of grief. He wants production maintained at the highest possible level, direct defense requirements handled adequately regardless of the impact on nondefense requirements and complete realism on the amount of steel required to support today's economy. When those three requirements are met under CMP, he believes, then CMP can be dropped, at least as far as steel is concerned. The third requirement has not yet been met, even closely, and the implication is that Mr. Sentner believes we're not yet ready to drop CMP.

He thinks that in 1952 direct military needs may take as much as 15 per cent of the national steel production. The requirements of defense-supporting industries he places at 60 or 70 per cent of the output. Mr. Sentner believes the industry will have capacity in 1952 for the production of more than 110 million ingot tons. We're producing now at the rate of almost 108 million ingot tons.

Pessimistic—Three factors, in the steel executive's judgment, can hobble output next year: Shortage of scrap, scarcity of alloying materials and interrupted operations. He predicts that the scrap drive will be moderately, though not spectacularly, successful. On the other side of the equation, a lowered steel demand in 1952 would limit production. Some inventories are high, and Mr. Sentner discounts the fact that overall requirements for next quarter are 65 per cent in excess of available output. "Such figures are totally meaningless as measures of imbalance between demand and supply. If demand for any product exceeds supply by 1 per cent, immediately all requirements begin to expand like a balloon."

Coming Up—CMP Help

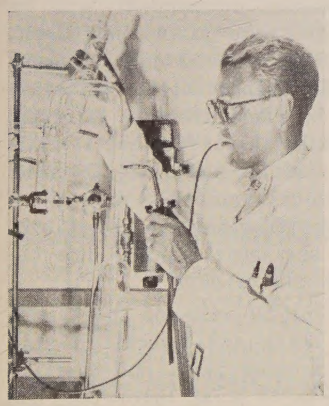
Having trouble getting your CMP tickets honored?

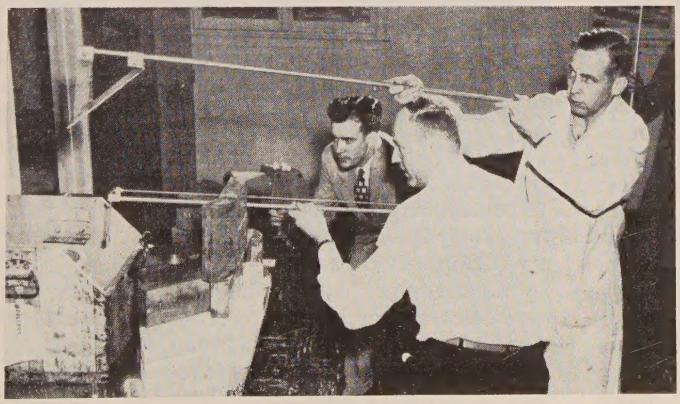
NPA has a new procedure it says will help you out, provided you can prove you have first tried to help yourself. Copies of Form 148 will be available at Commerce Department field offices, NPA industry division, the steel, copper and aluminum and magnesium divisions and at NPA's Office of Small Business. Fill out that form completely and send it to the appropriate official.

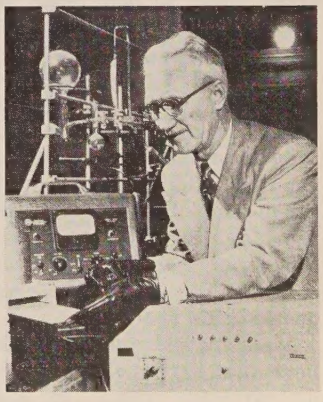
For aluminum products the official is Joseph Erwin, Chief of the Products Branch, Aluminum & Magnesium Division; for copper brass mill products, William L. Ashlock, chief of the Production & Scheduling Section, Copper Division; for copper wire mill products, C. W. Ange, chief of the Production & Facilities Section, Copper Division; for copper and copper base alloy foundry products, Walter Clark, chief of the Facilities Section, Copper Division; for steel products, Frank T. McCue, assistant to the director, Iron & Steel Division.

Bleak Second Quarter in Copper

A bleak prospect is promised consumers of copper in connection with their requirements in second quarter of next year. If defense needs are approved as requested, it may be necessary for NPA to cut off all civilian use of the metal in the second quarter. It may be necessary to deny nickel for all civilian uses, too, says an NPA spokesman.







ATOMIC RESEARCH—CIVILIAN STYLE: Research engineers are working with radio-active isotopes to find new and peaceful uses for them. A glass blower (left) seals a section of a newly "blown" mercury diffusion pump designed for unique test work in North American Aviation's Atomic Energy Research Laboratory. Research engineers (center) at Minneapolis Honeywell Regulator Co. tackle the ticklish job of transferring radio-active cobalt from one container to another. A mirror is held over the operation while the cobalt is picked up with long tongs and deposited in a lead sphere for storage. A professor (right) of Macalester College, St. Paul, demonstrates his converter for radio active "tracer" isotopes. Treated ceramic plates are run through dish washers to test their efficiency in eliminating dirt and grime

SOS for Nonferrous Scrap

Committee to find the material hopes to have a campaign in full swing by Jan. 1

A NONFERROUS scrap mobilization committee is completing its organization work now and expects to start a drive by Jan. 1 to get the industrial material.

Chairman of the industry committee which is backed by NPA is T. E. Veltfort, manager of Copper & Brass Research Association, New York. Vice chairman is M. L. Tressell, Aluminum Co. of America, Pittsburgh; and the secretary-treasurer is Paul Herzog, Federated Metals Division, American Smelting & Refining Co., New York.

No Ceiling—Mr. Herzog points out that "the sky is the limit" on the quantities of nonferrous scrap needed. The committee will push its campaign by advertising to get industrial and public pressure behind a move to find the material, primarily from industrial sources, although other good sources include regular steel scrap dealers, city transit companies, utilities and battlefields. About 2 million tons of all types of nonferrous scrap was consumed in 1950; more than that will have been gathered in 1951; but still more can be used in 1952.

Although a scrap shortage plagues producers of all nonferrous metals, the largest tonnage need is probably for copper scrap. In 1948, the post war year most nearly comparable with 1951, 973,000 tons of secondary copper was recovered from scrap, compared with 500,000 tons of lead, 325,000 tons of zinc, 287,000 tons of aluminum, 30,000 tons of tin and 8900 tons of nickel. Many nonferrous users, particularly of copper and brass, have to ship back the scrap to their supplier before they can get the new metal.

Losses—J. G. McNeely, purchasing agent for C. G. Hussey Co., Pittsburgh, is one of thousands of nonferrous purchasing agents across the country whose company has lost production because of the scrap shortage. Mr. Herzog points out that the scrap scarcity has meant "substantial losses" of nonferrous production this year.

Many people queried by STEEL believe that battlefield scrap, especially in cartridge cases, is one major source for the material which hasn't been thoroughly canvassed yet. Only 5 per cent of the people interviewed think that nonferrous scrap prices are too low to bring in the material. One thing irks most nonferrous scrap consumers: The reports that France and Britain are heavily stockpiling the materials to trade with the U. S. for new metals.

END OF A LANDMARK: The former powerhouse of Chrysler Corp.'s Dodge main plant in Detroit is being completely dismantled to obtain an expected 1.6 million pounds of scrap

NPA Cracks Down on Violator

A six months suspension from allocation and priority assistance and from the use of aluminum was meted out to Alside Inc., Akron, O., fabricator of aluminum siding, for illegal use of over 3 million pounds of aluminum. The National Production Authority took the action after a hearing Nov. 30 before NPA Hearing Commissioner Harrison W. Ewing. Several subsidiary companies of Alside were also affected by the order. NPA tried the case before a hearing commissioner to facilitate enforcement of its orders. It was not a criminal action.

NPA Rules on Materials Requests

No favorites are being played by the NPA Appeals Board in passing on requests for over-quota quantities of controlled materials. General Motors Corp. has been denied a request for permission to increase the number of passenger cars equipped with automatic transmission. Bell Trading Post, Albuquerque, N. Mex., was denied nickel silver for the manufacture of jewelry. Fein's Tin Can Co. Inc., Brooklyn, N. Y., has been denied permission to use tin plate to put bails and ears on paint cans.

Only one request for relief was granted—that to Circus Foods Inc., San Francisco, to consume an over-quota supply of tin.

Kaiser Opens at New Orleans

The first new primary aluminum plant to be brought into production under the nation's expansion program for the industry will make its initial pour on Dec. 11. This is Kaiser Aluminum & Chemical Corp.'s Chalmette plant at New Orleans.

First of eight potlines being built at the installation was completed in less than 10 months after construction started on Feb. 20, 1951.

The Chalmette plant is scheduled to produce 400 million pounds of aluminum a year, upon completion in mid-1953. Kaiser Aluminum's total capacity will then be 790 million pounds annually, or 28 per cent of the nation's production. Contracts for more than $45 million have been awarded to more than 225 major suppliers and subcontractors throughout the country for equipment and construction work at the Chalmette facility.

Want Aluminum Auto Pistons?

An assist to the controls-ridden auto industry is being offered from abroad. Open capacity to manufacture aluminum automotive-type pistons, skin-tight in Detroit, is being offered by the Karl Schmidt Works, Neckarsulm, West Germany. The plant has equipment to produce pistons to U. S. specifications and can supply up to 50,000 per month. The firm makes standard U. S. automotive pistons for the European replacement market.

Government Farther in the Scrap

If joint efforts of industry and government agencies are insufficient to keep iron and steel scrap moving in adequate quantities to the hungry maws of the nations steel mills and foundries, the government will be impelled to "take on the job" itself, warns DPA Chief Manly Fleischmann. Seriousness of the situation is shown by a spot check of 78 of the largest mills. As of Nov. 30, 11 mills had one week or less scrap, 29 mills an 8 to 15-day supply, 38 mills a 15-day or greater supply. The majority of mills say their supplies are between 15 and 21 days.

Movement of some of the 7 million old hulks and wrecks in auto graveyards may flush out over 1.5 million tons of scrap before the end of the winter. NPA decided to do something about that.

Effective Mar. 1, 1952, no auto wrecker will be permitted to have more cars in his inventory than the number he scrapped during the preceding 90 days or since Dec. 1, 1951.

Company-Wide Contracts?

Steel companies will fight the union demand for uniform wage scale for all plants

STANDARDIZATION of company-wide contracts for steelworkers is proving a big stumbling block in contract negotiations.

The single-contract proviso heads the list of steelworkers' demands being mulled over by steel companies awaiting developments in Pittsburgh, where United Steelworkers-CIO last week was amplifying its 22-point program to U. S. Steel Corp. Determination of the union to eliminate the multiple contracts is seen in its insistence on holding single meetings last week with a number of steel companies normally holding separate negotiation sessions in each of their plants. Sharon Steel Corp. for one is dickering with the steelworkers on a company-wide basis for the first time. Other companies doing the same last week: American Chain & Cable Co., American Radiator & Standard Sanitary Corp., Babcock & Wilcox Tube Co., Baldwin-Lima-Hamilton Corp., and E. J. Lavino & Co.

Opposition—Many steel companies will fight the single contract. The going wage rate in various regions varies by as much as 20 cents an hour. In equalizing the rate, the steelworkers surely won't settle for anything less than the maximum—plus what they get in current bargaining sessions. Steel companies are counting heavily on local union leaders objecting to further centralization of power stripping them of their most important functions.

The union will back down from many of its demands including the single contract, if the basic wage rate is jacked up high enough. Government economists are already thrashing out ways and means of granting an additional 15 cents to the steelworkers without ostensibly breaking the wage ceiling.

Wildcatters Slapped Down

Wildcat strikes and production slowdowns are meeting firm action by industry. Westinghouse Electric Corp. told the IUE-CIO its Bowling Green, Ky. plant will be closed permanently unless union leaders send their members back to work pledged to discontinue unlawful work stoppages. The plant has been shut down for nearly four months by disputes. Pittsburgh Plate Glass Co. teamed up with union officers to end a 3-day wildcat strike by positive action. The union termed the walkout a "flagrant violation" of the no-strike clause in its contract with the company and approved discharge of employees engaging in work stoppages or slowdowns.

Employment Drops Half-Million

Usual fall slowdown in farm and construction work and other outdoor activities caused total civilian employment to drop by half a million between October and November, says the Commerce Department. Civilian labor force dropped from 63,452,000 to 63,164,000 in the month and nonagricultural employment (54,314,000) remained virtually unchanged despite sharp drop in number of construction workers on the job. Unemployment moved up slightly from 1,616,000 to 1,828,000, but the number of jobless is still about a half-million below year-ago figures.

Keystone Lights Open Hearth

With its new No. 4 open-hearth furnace now in operation, Keystone Steel & Wire Co. has increased its steelmaking capacity one-third to approximately 425,000 net tons per year.

Pennsy Orders Equipment

Orders for $72 million in railroad equipment sent out by Pennsylvania Railroad brings the road's postwar equipment expansion-rehabilitation program to over $650 million. Of the latest order, $60 million is for 180 new diesel electric locomotives and 5000 freight cars. Additional appropriations of about $12 million are for new rails and rehabilitation of freight cars.

Freight cars will cost $29.4 million and will be built in the road's Altoona, Pa., works. Diesels will be built by American Locomotive Co., Baldwin-Lima-Hamilton Corp., Electro-Motive Division of General Motors Corp. and Fairbanks-Morse & Co. Orders totaling $7.2 million for 100,000 tons of rail were placed with U. S. Steel Co., Bethlehem Steel Co. and Inland Steel Co.

ASME Elects Officer

Reginald J. S. Pigott, director of the engineering division of Gulf Research and Development Co., Pittsburgh, was elected president of the American Society of Mechanical Engineers for 1952 at the society's 72nd annual meeting in Atlantic City, N.J.

Low Bidding on Government Contracts: Pros and Cons

THE JOB STAMPER was complaining: "We were underbid on a government contract by an outfit that didn't even know the contract called for a special packaging job that we figured would cost about one-third of the contract price."

His gripe is not a lone one. Listen to a commercial heat treater: "One of the biggest items we had to handle was for a company working on an experimental government order. We did it twice for them before they found they couldn't complete it successfully. The company didn't know the right materials. I haven't considered quite a few bids because I don't want to jeopardize the company and have my capacity tied up with something I might lose my shirt on."

LOW BIDS
. . . some have boomeranged

A Wide Range—Says a Pittsburgh fabricator: "We bid on an item on which final bids ran from 84 cents to $20.30. It's just the most absurd way of doing business in the world." He disdained the nation-wide, low-bid advertising for procuring armed forces contracts.

Not all small business is frowning hard at the situation: Some think nature should take its course, others that under competitive capitalism some bad is bound to result from the good. Undoubtedly some of the bidding is done in desperation or in ignorance, some in honest error.

One foundry is particularly rueful about the myriad of specifications for government contracts. It discovered that fine print in one corner of a blueprint (but not on the specs) called for not caulking some rivets that had been caulked. More than

one successful low bidder is sorry he didn't take a second look at the fine print. They have found their low bids have boomeranged.

Several small businesses believe some low bidders think the government will bail them out of their difficulties. In most cases they're dead wrong.

What Goes On—If contracts were low bid in bad faith, the government will make no upward adjustment in price. Bidders, say procuring agencies for the armed forces, are certified as to financial responsibility, know-how, productive capacity. Procuring agencies (like the Air Materiel Command) are required by regulations to let contracts to the lowest responsible bidder. If the contract exceeds $5000, a facility capability report, taking into account financial and productive responsibility, will strain out irresponsible bidders in most instances.

One possible explanation of inordinately low bidding is this: Contractors on *negotiated* bids can renegotiate later for higher prices. Bidders who get contracts through *advertisements* may think they can also negotiate again later. But they can only if they can prove bankruptcy, no fraud, a price mistake and the fact that they're working on needed defense work.

Big Step Into Aviation

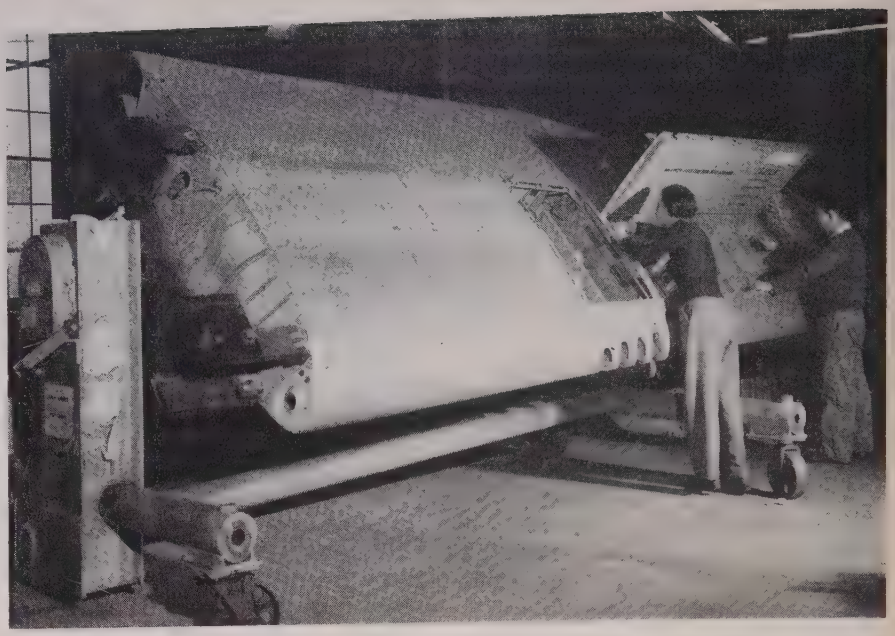
Crane Co., an industrial valve maker, looks to the future and moves into the aircraft industry

ONE of the largest manufacturers of industrial valves and fittings has stepped into the aircraft industry.

Also known as a heating and plumbing equipment firm, Crane Co., Chicago, has acquired the assets of Hydro-Aire Co., Burbank, Calif., maker of aircraft valves, filter actuators and other aircraft accessories. The purchase involved about $4 million.

Immediate Expansion—An immediate expansion program is planned to add to Hydro-Aire's present 50,000 square feet of floor space and $10 million order backlog. "Activity in the more advanced jet engine and rocket propulsion fields provide the confidence for planning beyond the limit indicated by current defense budgets," says J. L. Holloway, Crane president.

Hydro-Aire has perfected the Hytrol anti-skid brake system, which improves brake efficiency for aircraft of all weights by tending to eliminate the locking of brakes and skidding of tires during landing roll. This braking system is going into service on many commercial and military aircraft.



FROM FREEZERS TO FIGHTERS: Thunderjet wings are being built by Servel Inc. for Republic Aviation's jet fighter aircraft. Much of the aluminum that Servel gets from Kaiser Aluminum Co. goes into defense items instead of Servel's regular line of gas refrigerators. During World War II, Servel built P-47 Thunderbolt wings

Pathfinding in Titanium — Crane Co. is also devoting its engineering and chemical brains to finding an efficient process for capturing titanium from the raw ore. Currently, company engineers are exploring titanium deposit possibilities and have taken an option on a few claims. Crane's pilot plant is turning out 500 pounds of sponge titanium a week.

Being versatile and aggressive, Crane Co. believes it still has a great future in the existing half-and-half economy. That's why a big maker of industrial valves, fittings, bath tubs, kitchen sinks, shower heads, radiators and boilers is now in the aircraft industry.

Pickup in Ammunition Contracts Begins

THE PREDICTED PICKUP in ammunition contracts (STEEL, Nov. 26, p. 53) is beginning to be felt. Almost any kind of metalworking equipment can be used for some phase of ammunition subcontracting. What are your possibilities?

Minneapolis-Moline Co. has just been awarded a contract for reactivation and operation of a government-owned shell plant at New Brighton, Minn. The reactivation and equipment contract alone amounts to about $2 million. When in operation, the plant will produce artillery shells for the Army.

American Car & Foundry Corp., Buffalo, has received a multi-million dollar order for a new type demolition bomb. The company is spending about $1 million putting the plant in shape and for new equipment.

Also started tooling up for a $25,250,000 order for shell fuses, Houde Engineering Division of Houdaille-Hershey Corp., Buffalo, expects to add workers in the first quarter of 1952 to fill the order. Defense production at the plant has more than offset cuts in output for the auto industry, it was reported.

Other contracts awarded by the government, in excess of $250,000 follow:

Product	Contractor
Turret Lathes	Gisholt Machine Co., Madison, Wis.
Floating Bridges	Farm-Rite Implement Co., Chicago
Half Pneumatic Floats	General Tire & Rubber Co., Akron, O.
Folding Cot Adaptors	Wheeling Corrugating Co., Wheeling, W. Va.
Boilers	Cleaver-Brooks Co., Milwaukee
Tracer Cartridges	Remington Arms Corp., Bridgeport, Conn.
Boosters	Royal Typewriter Co. Inc., Hartford, Conn.
Parachute Bombs	Standard Products Co., Cleveland
Bomb Fuzes	Bayshore Industries Inc., Elkton, Md.
Bomb Cookers	Cleaver-Brooks Co., Bridgeport, Conn.
Tank and Combat Vehicle Parts	Lipe-Rollway Corp., Syracuse, N. Y.
Spares for Tractors (3 contracts)	Caterpillar Tractor Co., Peoria, Ill.
Repair Parts for Pumps	Warren Steam Pump Co. Inc., Warren, Mass.
Radio Sets	Emerson Radio and Phonograph Corp., New York
	Motorola Inc., Chicago
	Radio Corporation of America, Camden, N. J.
Radio Towers	Dresser Equipment Co., Columbus, O.
Transformers	Pennsylvania Transformer Co., Canonsburg, Pa.

Renegotiation Clarity

Recapturing of excessive profits will be done so as to lighten the burden on primes and subs

TO GUIDE CONTRACTORS through the maze of renegotiation that industry will be faced with eventually, two interim regulations were issued by the Renegotiation Board. John T. Koehler, its chairman, promises the board will frame its regulations in the future to advise contractors as clearly as possible how to determine what income from defense contracts is subject to renegotiation. Till the act is spelled out more definitely the two interim regulations can be used as guides.

Number One—In one regulation, sales under defense subcontracts of standard items like nuts and bolts and maintenance and operating supplies were exempted from renegotiation under the 1951 Renegotiation Act. The interim measure applies only to money received or accrued from sales under such subcontracts before Jan. 1, 1952. It does not apply to materials bought specially for equipment produced for defense. A similar exemption was granted under the 1948 Renegotiation Act.

Number Two—Pending issuance of regular regulations, the second regulation is meant to help prime and subcontractors determine the amount of negotiable income derived before Jan. 1, 1952, from contracts not covered by the "stock item" exemption. It gives assurance the segregation will be accomplished in a practical and realistic manner under the 1951 act as under previous renegotiation acts.

Contracts subject to the act are those with the armed forces and 15 civilian government agencies. Dates on which incomes become subject to the 1951 law vary with the agency concerned. The act applies to all subcontracts related to prime contracts with those agencies to the extent of receipts or accruals determined through accepted accounting procedures used by the contractor. (See STEEL, Apr. 9, p.48).

To determine renegotiable profits contractors must total all accruals on contracts with the government agencies on and after effective dates. Subcontractors can check with their customers to find out how much of the goods sold to them are being used for defense. Subcontractors may use governmental, trade association or other reports if the subcontractors supply many customers in the same industry. Percentages may be expressed in dollars or units. Contracts usually tell subcontractors if they're subject to renegotiation. Some contractors include renegotiation clauses in contracts as a general rule—whether or not they are subject to the act.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

COMMUNICATIONS—Amendment of Nov. 29, 1951, of NPA Order M-77 requires domestic telephone, telegraph and cable companies to file applications for quarterly allotments of controlled materials at least 120 days before the beginning of the quarter.

MACHINE TOOLS—Amendment of Dec. 3, 1951, of NPA Order M-41 makes it clear that machine tools covered by government pool order contracts may not be diverted after Feb. 1, 1952, to fill nonpriority rated orders placed by private buyers.

NPA Regulation

CHEMICALS—Amendment of Dec. 3, 1951, of Direction 3 to NPA Regulation 2 makes it possible for all ratings issued by the Defense Department and the Atomic Energy Commission to be effective in obtaining basic chemicals.

Price Regulations

PRICE ADJUSTMENTS—Supplementary Regulation 18 to Ceiling Price Regulation 22 gives relatively small manufacturers a simpler pricing method under which they may adjust their ceiling prices in accordance with the Capehart amendment. SR 18 was effective Nov. 26, 1951. Option to use this supplementary regulation is limited to manufacturers with annual sales volume of not more than $1 million.

PRICE ADJUSTMENTS — General Overriding Regulation 20 issued by the Office of Price Stabilization Nov. 28, 1951, provides a simplified method which certain small manufacturers and sellers of industrial services may use in making price adjustments under the Capehart amendment. This regulation, which became effective Nov. 28, is particularly of benefit to small firms which do not keep detailed accounting records.

TIME EXTENSION—Amendment 4 of Supplementary Regulation 12 to Ceiling Price Regulation 22 extends indefinitely a manufacturer's option to elect to use either the General Ceiling Price Regulation or Ceiling Price Regulation 22 for pricing certain listed commodities. The amendment also deletes from and adds to the list of commodities to which the option applies. Amendment 4 was issued Nov. 29, 1951, and became effective on that date.

RADIATION, BOILERS—Supplementary Regulation 19 to Ceiling Price Regulation 22 authorizes manufacturers of cast iron radiators and boilers to adjust ceiling prices in line with increased costs. SR 19 was effective Dec. 3, 1951.

STEEL WAREHOUSES—Ceiling Price Regulation 98 issued Nov. 29, 1951, establishes ceiling prices for resellers of a wide variety of iron and steel products. For some resellers the effective date of this regulation is Dec. 16, 1951; for others it is Dec. 31, 1951.

MANUFACTURERS — Amendment 35 of Ceiling Price Regulation 22 eliminates in some cases the 15-day waiting period provided in CPR 22 with respect to commodities reported on an Office of Price Stabilization Public Form No. 8. Amendment 35 is effective Dec. 10. 1951.

MACHINERY—Amendment 23 of Ceiling Price Regulation 30 eliminates the 15-day waiting period provided in CPR 30 with respect to commodities reported on Office of Price Stabilization Public Form No. 8, whose proposed ceiling prices are higher than the General Ceiling Price Regulation ceiling prices. Amendment 23 is effective Dec. 10, 1951.

OVERHEAD ADJUSTMENT—Amendment 1 of Revision 1 of Supplementary Regulation 2 to Ceiling Price Regulation 22 authorizes a time-saving method of calculating an overhead adjustment factor for manufacturers who use Revision 1 of SR 2 to CPR 22 in making their Capehart amendment adjustments. Amendment 1 was issued Dec. 6, 1951.

MACHINERY RESELLERS—Amendment 4 of Ceiling Price Regulation 67 authorizes certain resellers of machinery and related manufactured goods to apply their customary markup to net invoice cost, including manufacturer's excise taxes. Amendment 4 is effective Dec. 10, 1951.

MACHINERY INVENTORY—Amendment 22 of Ceiling Price Regulation 30 authorizes manufacturers pricing under CPR 30 to reflect in their ceiling prices current changes in excise taxes on sales of commodities bought from other manufacturers for resale under a private brand name. Amendment 22 is effective Dec. 10, 1951.

AUTO, AIRCRAFT PARTS—Supplementary Regulation 81 to the General Ceiling Price Regulation authorizes manufacturers of automotive or aircraft parts, accessories and equipment, who are pricing under the GCPR, to round ceiling prices in adjusting their ceilings to reflect recent changes in the manufacturers' excise taxes. SR 81 is effective Dec. 10, 1951.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Army Ordnance and auto industry team up to push interchangeability programs. Four standard engines now in production can power over twenty combat vehicles

ONE SPECTACULAR result of Army Ordnance's program for parts interchangeability, is seen in engines for combat vehicles. Assisted by the automotive industry, Ordnance has now put four engines in production. From these four a selection can be made to power any of the twenty-odd land tanks, tractors and self-propelled artillery pieces now in production.

What this means is best told by comparing a typical engine of World War II with a comparable engine of today. In World War II six different engines were produced for the medium tank known as the M-4; there were 5165 parts in this engine—none of them interchangeable. For today's medium tank there is only one engine; of its 4846 parts, 4606, or 95 per cent are interchangeable.

Why and Wherefore — Advantages of such interchangeability are great. Costs of manufacture are reduced, number of replacement parts shipped to and stored in Army depots is kept at a minimum, and the problem of training mechanics for repair and maintenance is simplified (reducing the number of troops assigned to this type of duty).

The four basic engines which Ordnance contractors are producing range in horse-power from 225 to 810. Two more basic engines, one smaller and one larger than the above range, will be added shortly. From these 6 engines it will be possible to select an engine to power any combat vehicle of the present or foreseeable future.

The Idea Spreads — Ordnance's standardization is not confined to engines alone. Such major components as generators, torsion bars, ignition systems, and suspension systems are getting the same treatment.

Corporal Punishment . . .

Patience exhausted, the National Production Authority is baring its teeth to businessmen who violate or fail to comply with its orders. A survey by some 200 investigators reveals that more than 99 per cent of business is acting in good faith; chiselers comprise less than 1 per cent.

In three actions against alleged violators, NPA is seeking jail sentences. "Chiselers," says Manly Fleischmann, "view a fine as merely a cost incidental to making large profits on illegally acquired steel, copper and aluminum. The only way to discourage these people is to clap some of them into jail. That's what we propose to do. But if we don't get them into jail, we're certainly going to deprive them of further supplies of critical materials. And if that drives them out of business it will be no more than they deserve."

The new policy is the immediate result of disclosures before the Moody subcommittee of a considerable black market in steel based on sales of material illegally obtained by the black marketeers.

ON HOT SPOT: In charge of consumer curbs is Roger L. Putnam, new director of the Economic Stabilization Agency. Mr. Putnam, president of Package Machinery Co., East Longmeadow, Mass., has jurisdiction over the Office of Price Stabilization and the Wage and Salary Stabilization Boards

The Lofty Tone . . .

For purposes of winning friends abroad, it might be better if government officials refrained from addressing foreign visitors — beyond simply extending greetings and Godspeed.

Over the past couple of years thousands of foreign industrialists have toured U. S. plants as guests of Economic Cooperation Administration to get ideas on how to increase production and efficiency. On these trips everything has been fine—except for the "indoctrination" speeches on the American productive system. The lofty tone of some of our government officials doesn't always set well.

At a typical indoctrination session (on Nov. 30), ECA welcomed 287 of Europe's top industrialists following a two-week tour of American plants. The visitors drew a warning that they will have to develop a unified European market before they can have the production efficiency of the U. S., a dressing-down for their labor-management setup and a recommendation that they get rid of all remaining vestiges of the cartel system and remodel their economies on the American pattern.

Many present felt it would have been better to send the visitors back home with just a friendly word—letting them determine for themselves how they could improve their operations and solve their problems by mulling over what they had seen and heard.

New NPA Administrator

Walter H. Wiewel has been appointed as assistant administrator of the NPA, in charge of the Metals and Minerals Bureau. Mr. Wiewel, on leave fro m Crucible Steel Co. of America, came to NPA on a rotation program under which businessmen are asked to serve for a period of time in NPA divisions where permanent qualified personnel is not available.

For Hire: Idea Power

Employee's suggestions often offer ways of raising productivity, efficiency and safety

INDUSTRY is still missing a good bet on increasing productivity at a time when it needs it most. Says R. E. Roberts, manager of employee relations of Ford Motor Co., "Only 5 per cent of the ideas of the workers in the U. S. are included in suggestion systems." What does it mean? Says Mr. Roberts: "The ideas of nearly 95 per cent of America's work force are being wasted."

It's the man on the job, closest to the problems of production, who is most likely to see practical ways of boosting output or efficiency. Even today relatively few companies take advantage of employees' ideas through formalized suggestion systems.

Lukewarm—Many companies having suggestion systems refer to them as "something that helps morale." Properly set up and administered, the suggestion system can stand on its own financial feet and repay company investment manifold.

In World War II, when idea systems were at their peak of popularity, production suggestions saved an estimated 200 million man-hours of work per year—equivalent to a full year's work for about 80,000 workers. The Army says it saved more than $100 million through "employee" suggestions since 1943 alone.

Payoff is Cash—As a means of cutting cost, a morale builder and a stimulant to thinking, suggestion systems, think companies using them, are a two-way street—if they work. Not all suggestion systems work; the fault can be equally divided between administering the system and appreciating its value. Often the size of the company determines how much attention is paid to administering the system. It is generally a full time job for one or more executives and must be run with as much efficiency, energy and continuity as any other operating department of the company.

Longshot—Requisites for starting a good suggestion system: Perseverance, constant selling, smooth-functioning machinery that generates prompt action on all ideas, attention-getting suggestion boxes and ample publicity inside and outside the plant. Major incentive to the worker is cash; other rewards are pride in accomplishment, a sense of belonging.

Results are obtained only after the employee is educated to the part he must play in developing worthwhile ideas. One plant manager puts it this way: "A really good idea comes along once in a blue moon. But we can't take a chance of missing that one suggestion."

Birmingham on a Broader Base

Do you have a plant in an area where there's little or no industrial diversification? If you're worried about such a situation, you can do something about it. Birmingham business men can point the way.

A Matter of Economics—Nearly two years ago, in January, 1950, they decided to do something about the fact that Birmingham had a steel industry, but little else. Never doubted has been the economic worth of a steel industry in the area, but needed was greater diversification to assure the city of a more balanced growth.

Clarence B. Hanson Jr., publisher of the *Birmingham News,* started the ball rolling by appointing a committee of 100—a group of business men believed the first of its kind—to get more industries into the district. Using the slogan, "Pay Your Civic Rent," the committee raised a fund that now stands at $700,000 to advertise Birmingham nationally. Steel men responded and—to the limits imposed by government restrictions—have been able to assure steel to many of the companies getting established in Birmingham under the aegis of the Committee of 100.

Selling Point—Steel is one of Birmingham's biggest selling points, especially since steel expansions in the area will eventually push the district's capacity up at least 500,000 tons annually.

But steel users alone haven't settled in Birmingham. Since January, 1950, the committee of 100 has brought 35 new industries into the area. Some are large; many are small. Some use steel; many use a variety of raw materials from cotton to lumber.

The South Looks Up

The South has checked its human and economic erosion.

So says John R. Steelman, assistant to the President, who spoke in Atlanta. He says that in 1950 alone 12,000 new businesses were established in the South, giving new jobs to more than 330,000 people. A decade ago, the South had 10 per cent of the national income, but now it brings home about one dollar out of every seven earned in the U. S. While the average per capita income for the country as a whole has climbed 96 per cent in the past 20 years, it has jumped 156 per cent for the 16 million people in the 14 Southern states. More than $1 billion was invested in Southern industry in 1947. "The rate of capitalization has increased since the beginning of the defense mobilization program a year and a half ago," Mr. Steelman says.

Texas, Louisiana and Arkansas, soon will be producing more aluminum than the whole country did before World War II.

FOR MORE EUROPEAN TRADE: L. W. Beck, vice president sales, Cummins Engine Co. Inc., and G. W. Glenn, vice president and general manager, Cummins Diesel Export Corp., talk over their recent five-week trip to England, Scotland, Sweden, Belgium, Germany, France, Switzerland, Portugal and Spain. Dollar shorages are delaying importation of more American-made heavy-duty machinery, they found, and licensing procedure in all European countries is also an important contributing handicap to this export trade

Sweden . . . World's Armament Needs Work in Her Favor;

Sweden is in the happy position of having the prices go up faster on her exports than on her imports, as she tries to work out a five-year-industrial plan

SWEDEN, A TRADITIONAL neutral, is riding the crest of the rearmament boom. But, she has difficult problems in trying to work out her five-year-industrialization plan during the mobilization period.

Internally and in foreign trade the adjustments to the Korean-keyed world situation have been sharply felt in "neutral" Sweden. The wholesale price level has gone up about one-third from September, 1950 to June, 1951. During the same period, the cost of living has increased by 16 per cent and the wage level by about 19 per cent. Since July, 1951, the rise in prices has slowed down somewhat, but they remain at a very high level.

Inflationary Pushes — Wages are given an added push upward by an acute shortage of production manpower, especially in the iron and steel industry, engineering works and shipyards. Inadequate supplies of materials and fuels coupled with this labor shortage have combined to hold industrial output to about a 5 per cent increase during the first eight months of 1951.

Foreign trade continues to expand considerably. The volume of imports has risen almost uninterruptedly. The quantitative rise of exports has been insignificant, but a jump in world market prices for these products has enabled Sweden to substantially improve her foreign exchange position.

A Happy Situation—World market prices have been going up more steeply than the prices of Swedish iron and steel; during the first half of 1951 the prices of Swedish iron castings were raised about 20 per cent. The result has been that the competitive power of the Swedish works has strengthened both on the home market and abroad.

Sweden is entirely self-supporting in regard to iron ore, but about a quarter of all steel produced in the country is derived from scrap. A great deal of the scrap supply has to be imported and sufficient quantities have not been forthcoming. This is also the case for alloying metals such as cobalt, molybdenum, tungsten, nickel and wolfram. Imports of coal and coke from Poland, the main contractor for Sweden, have not developed as expected, and coal from the United States can only be imported in comparatively limited quantities owing to a shortage of shipping space.

WITH this issue, the editors of STEEL begin a series of articles on what happened in 1951 and what's likely to occur in the future economically for the major Western European countries. Next week, Dec. 17, we will deal with Belgium, and France. Western Germany and Great Britain will be studied Dec. 24. A summary of the situation in Western Europe will appear Dec. 31. Complete iron and steel statistics for all industrial nations will be carried in our 1952 Metalworking Yearbook issue, Jan. 7.

Net Result—The net result is that the output of iron and steel has shown little increase in 1951. In the first eight months of the year production of iron castings increased only 2 per cent to about 920,000 metric tons, while pig iron showed a decrease of 2 per cent to 510,000 tons in comparison with the same period of 1950.

Imports of iron and steel products ready for the market during the first eight months of 1951 were about 460,000 tons, compared with 375,000 tons in the corresponding period of 1950. Imports of pig iron and scrap fell to only about half of the volume imported during the eight months period of 1950. The domestic supply of pig iron decreased significantly as the exports increased at the same time from 24,000 tons in the first eight months of 1950 to 42,000 tons in the like period of 1951. Exports of rolled and forged steel also rose sharply and reached 85,000 tons as against 60,000 tons in 1950.

HYDRO-ELECTRIC PLANT IN SWEDEN
. . . if you don't have coal, use water

If Sweden can solve the materials, fuels (primarily coal, coke, oil and sulphur) and labor problems in her iron and steel industry, she can stay on top of the rearmament boom.

Internal Troubles—She'll have to partially solve them anyway to avoid bigger internal problems. Expansion in Swedish steel-consumer industries, engineering works, shipyards, and construction almost galloped out of control early in 1951. The Swedish government has tried to limit investments in these fields by various methods, such as a 10 per cent tax on investments in machinery and stock of commodities, a tax on electric power and an excise tax of 10 per cent on the retail price of automobiles. Despite this, expansion in these fields will probably continue.

To regulate her war-born prosperity, and resultant inflationary tendencies, a government commission recently published a long-term plan (1951-1955) to indicate the probable development of the Swedish economy. The commission anticipates that the mining of iron ore may increase by 50 per cent and reach a rate of 19 million tons per annum by 1955. Of this, 16.8 million tons will be marked for export. It is expected that the output of iron and steel finished products ready for the market will be increased to 1.6 million tons, as against 950,000 tons in 1949.

Exports, which consist mainly of high grade products, are expected to increase from 110,000 metric tons to 80,000 tons, while import requirements should be reduced from 600,000 tons to 375,000 tons.

The Plans—Expansion in construction is being restricted by government control, but there is a need for investments in schools, hospitals, transport and trade services. Housing is another field in which requirements have reached the urgent stage. In agriculture and industry the volume of investments should remain at present levels. Further government restrictions on investments in some directions and incentives in other directions may be necessary.

If all goes according to the govern-

But U.S. Aid in 1952 Will Still Be Needed by . . . Italy

Production continues to expand but its high cost hinders a faster Italian armament buildup and agricultural reforms. Lira's buying power must be protected

UNFAVORABLE BALANCE FOR ITALY
. . . more imports than exports

ITALY, LIKE MOST other western European countries, is expanding her industrial and agricultural production under the stimulus of world rearmament programs. But she'll probably continue to lean on the United States for help with her biggest problems, financing the expansion and maintaining the value of the lira.

The irregularity or lack of power and fuel has been one of Italy's greatest handicaps on industrial production in the past. Several factors alleviated that condition in the year now ending.

An Important Factor—Heavy falls of rain and snow, as well as the fact that new hydroelectric power stations started operating, combined to make possible an output of 28 to 29 billion kwhr of electric power for 1951, with an increase of 3 to 4 billion kwhr over 1950. This is particularly important in Italy since a good part of Italian steel—perhaps over 40 per cent—is made in electric furnaces.

The iron and steel industry showed an annual rate of production well above that of 1950. For steel ingots and castings the increase was about 40 per cent. In July, 1951, the general index for industrial production reached a new peak of 143 (1938 base—100), an increase of 19.2 per cent over July, 1950, according to the Department of Commerce publication, *Foreign Commerce Weekly*.

There is an upward trend in the proportion of thin rolled products made, as compared with the total output of steel. Some larger plants are being transformed to meet this need and the trend is expected to grow.

More Power—ECA and free-dollar financing loans made possible shipments of 1.8 million tons of coal in the first half of 1951 from the U. S. to Italy. This amount is expected to be slightly less over the remainder of the year, but it has helped offset the reduced imports of European coal. Gas consumption rose 5.3 per cent in the first seven months of 1951, and is expected to jump even higher when methane, which is produced in large quantities in the Po valley, is conveyed to the largest iron and steel works in northern Italy by a pipeline already partially complete.

Some concern, on the other hand, is being felt in the case of supplies of raw materials such as nonferrous metals. Favorable expectations are based mainly on announced increases of expenditures in connection with the rearmament program.

Further Improvement—To improve further the engineering branches of industry, a seven-man team of experts from Stanford University spent six months in Italy this year with the objective of developing a long-term plan of methods and means.

In the engineering sector, it is noteworthy that a far-reaching program for mechanization of Italian agriculture is being carried out. Experts say that about half of the approximately 46,000 to 47,000 square miles of arable land in Italy could be cultivated mechanically; only one-third of this arable land is now provided with this advantage.

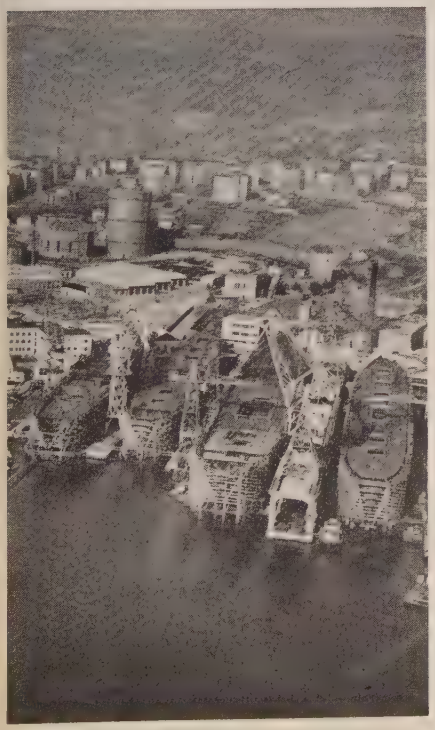
For agricultural machines the level of output is the same as in the best prewar years, while the national output of tractors is about 8000 per year.

Unfavorable Balance — Italian foreign trade has continued to expand, both in imports and exports. However, exports have increased more in volume and imports have risen more in money value. The result: An unfavorable balance of trade that left Italy with a $311,300,000 deficit for the first seven months of 1951. Imported items that accounted for most of the deficit were petroleum, iron and steel scrap, cereals, wool, hides and skins, lead, and tin.

Scare buying, an unfavorable balance of trade and a limited monetary reserve have forced the Italian government to put a new program of controls into effect. The government has issued a decree-law prohibiting nonessential uses of copper, nickel, zinc, and their alloys. Also, a decree-law on stockpiling of foodstuffs and raw materials has been put into effect.

Adding It Up—It all adds up to an effort by Italy to strengthen her competitive power in the rearmament program with a small capital reserve. Italy's future financial policy is pointed at three objectives: Defense of the buying power of the lira; continuation and improvement of investment and employment programs; and financing for rearmament purposes within the actual possibilities of the Italian financial and economic situation.

ment's present five-year-industrialization plan, and if the world situation does not reverse itself, there should be an increase of 5 per cent per annum in the total volume of investments and an increase of 3 per cent per annum in the gross national income by 1955.



SHIPS ABUILDING AT TRIESTE
. . . Italy tries to increase this activity

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By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

NPA may allow 1 million cars, 250,000 trucks to be built per quarter, but would grant materials for 80 per cent of that. Ingenuity would have to account for the rest

DEFENSE MOBILIZER C. E. Wilson last week put his finger on the crux of the controversial question: "Is our military output lagging?" when he said it depends on whose schedule you're going by. Military production, by his timetable, is on schedule, but not by the Defense Department's "hopes."

Around Detroit the knowledge that defense production has not taken up the slack caused by civilian output curtailment is reason enough for most people to conclude that somewhere the planning went haywire. The solution looks simple: Either ease up on materials restrictions so that more civilian goods can be produced, or leap over the tooling and equipment hurdles so that military production becomes a flood instead of a dribble.

Not So Simple—Either way is easier said than done. NPA is committed to a minimum disruption of production. And each decision which cuts civilian output has been harder to make than the last. What has been buoying automakers' hopes that 1952 passenger car production would be allowed to continue at about the million-a-quarter level has been the certainty that an unemployed autoworker, through his union, speaks with greater effect on Washington than does any industrialist. NPA, however, is indicating that it is willing to twist down hard on civilian industries to get the military machinery into higher gear. There is no doubt in automakers' minds that the tightening procedure will be accompanied by thread stripping.

One scheme which NPA reportedly is toying with is to set the second quarter output limit at one million cars and a quarter-million trucks, and then give CMP steel, copper and aluminum allotments for only 80 per cent of this production, leaving the difference to be made up with ingenuity. This kind of "solution" might make NPA look superficially as though it was not repressing production, and conceivably could be heralded as providing a stimulus to use substitute materials. Certainly it would revive automakers' interest in conversion steel and might change their stand-offish attitude toward gray market materials, if the companies could see some chance for recovering their greater costs.

However, it is extremely improbable that anything like 20 per cent of their requirements of copper could be arranged for outside of CMP unless they were allowed to buy it outside of this country. Or that in the short time they would have at their disposal they could work out satisfactory substitutes. Such an order, in short, would be tantamount to a production ceiling of 800,000 cars and 200,000 trucks in second quarter regardless of how generous NPA might be with its "allowable" production figure.

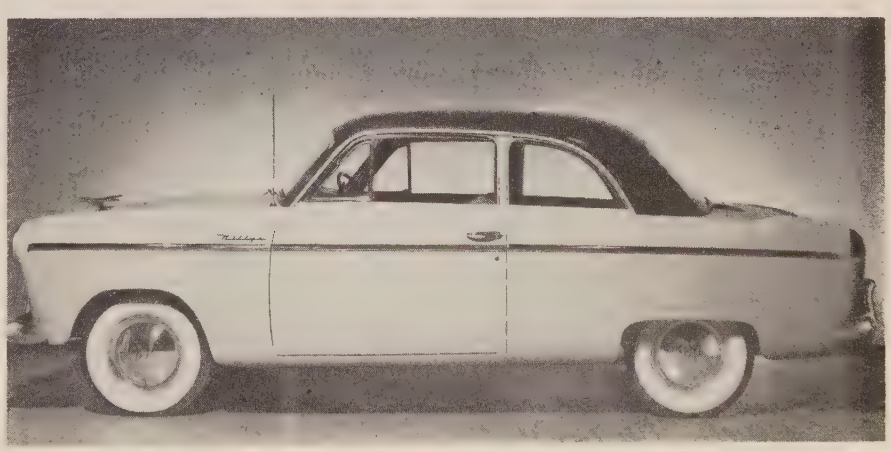
No Manpower Shortage

The prophecy made time and again that there will be a manpower shortage are empty words right now as far as the auto industry is concerned. Ford and Chrysler have announced new layoffs of 25,500 employees, 23,000 by Ford throughout the country while model changes are made this month, and 2500 by Chrysler at Detroit because of schedule rearrangements to conform with fourth and first quarter output quotas.

In the Detroit area generally, the number of unemployed persons topped 100,000 in mid-November for the first time in 20 months, according to the Michigan Employment Security Commission.

Walter Reuther, meanwhile, has taken up the cudgel for tool and die shop workers to win Wage Stabilization Board approval of substantial pay hikes. In pressing this fight against an earlier WSB turndown he answers the expressed contention among UAW tool and die members that he is more interested in production workers' problems than in theirs, and at the same time gets in a lick or two for his proposals regarding the building of machine tools.

The manpower and production situation in the tool and die industry is "one of the most serious bottlenecks in our whole defense production effort," he states. Captive tool and die shops are not using their full capacity and their work-



NEWEST OF THE NEW CARS: First model of the Willys passenger sedan, the Aero Wing, will not be introduced to the public until early next year. The new light weight, nearly standard-sized car, is reported to deliver up to 35 miles to the gallon at 30 miles an hour with overdrive using regular gasoline. The styling, say Willys engineers, represents a combination of advanced principles of aeronautical and automotive engineering

ers are on normal or short workweeks, while job shops are consistently working overtime, he says.

Defense Work on Schedule

Most auto companies say their own defense work is on schedule. Chevrolet Motor Division's general manager, T. H. Keating, reports that the tool-up for parts production of its largest defense contract —Wright R-3350-30-W and R-3350-26-W aircraft engines—is on schedule despite difficulties in obtaining machine tools. At its Cleveland plant, where final drive units for Fisher Body's medium tank will be made along with front axles and stampings for GMC's 6x6 military trucks and parts and subassemblies for the two aircraft engines, all assignments are "on schedule and gaining momentum." Ground was broken ten days ago, and only 24 hours after the excavation and substructure contract was awarded for Chevrolet's million-square-foot aviation engine plant at Flint. The division began a similar size expansion at Tonawanda, N. Y., in September.

L. L. Colbert, Chrysler president, stated that his corporation is ahead of schedule on most of its war work, behind on none.

An early bird in defense work, Kaiser-Frazer already has more people thus engaged than do many larger auto companies. A total of 8000 workers and 2.3 million square feet of space in five of its plants are either producing or tooling up military items.

The build-up of military production once it begins in earnest can be exceedingly rapid. Packard, for example, expects to increase its employment from about 11,000 now to around 25,000 to 26,000 by the end of next year when more than 50 per cent of its sales will be of military items. K-F believes in six months it may have 20,000 people on defense work, and another 5000 so employed by late next year. For Chrysler, expectation is that the number of employees now on war work—7500—will about double by April 1. Ford, with more than $1 billion in contracts, has no major ones in production.

Don E. Ahrens, GM vice president and general manager of Cadillac, and Colonel Saholsky of the Cleveland Ordnance District have announced that the military has raised its commitment for Cadillac-built Walker Bulldog tanks by about a third, to bring the total contract to about $750 million. Production at the former Cleveland bomber plant will be stepped up about 69 per cent, says plant manager E. N. Cole, necessitating more employees and greater output from the plant's 3000-odd suppliers. Chrysler's tank engine job at Michaud Ordnance Plant, New Orleans, where the present 800 workers are a cadre for the 6000 who ultimately will be employed, has received the same green light —instead of 1.2 million square feet originally assigned for the tank engine job, its entire 1.8 million square feet of manufacturing space will be employed.

At Evansville, Ind., where Plymouth Division of Chrysler is building Grumman amphibious plane hulls, all the assembly workers who will be needed as the production schedule increases have already undergone their special training and many have been put back to work assembling Plymouths until they are needed.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	505,758	760,847
October	548,350*	796,010
November	468,000*	833,784
December	.....	671,622

Week Ended	1951	1950
Nov. 10	117,342	161,038
Nov. 17	120,767	122,498
Nov. 24	80,489	122,716
Dec. 1	117,224*	152,107
Dec. 8	120,000*	162,757

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Dual-Purpose Plant Studied

As General Motors' C. E. Wilson hoped it would be when he proposed it, the dual purpose plant idea (STEEL, Oct. 15, p.57) has attracted an intelligent analysis outside of his organization.

Chrysler's chairman, K. T. Keller, not long ago indicated his belief that special purpose plants are preferable for many military products. The tank arsenal at Center Line, Mich., was his example. Built for production of five tanks a day, it achieved a 40-a-day rate during World War II primarily by changing from a manufacturing facility to a sub and full-assembly facility, the manufacturing operations being performed outside by many subcontractors. Edgar Kaiser, K-F president, now comes along to point up some good and bad features of the dual-purpose plant. Willow Run is such an operation. It was converted to its civilian-military work "without the loss of one manhour on the automobile production line," he told an SAE and Institute of Aeronautical Science meeting in Dayton.

The idea makes good sense, he said. Its positive points include taking full advantage of existing facilities, savings of manpower by bringing to bear an existing and smooth functioning organization, no dislocation of people, elimination of the cost of new facilities—a savings of money, manpower and materials. From the standpoint of government the idea is economically sound, he says, but the corporation doesn't make out too well. Companies "which accept the dual purpose plant theory are penalized. These companies building new facilities exclusively for war production are rewarded," Mr. Kaiser declared. "From its own point of view industry would be much farther ahead building new plants than in disarranging their present plants and bearing the unusual expense of returning these plants to peacetime operation." Without assurance that defense contracts will continue for any stated period, the company takes a chance that it may have to convert back to civilian goods at a greater expense than any profit it may have made from war work, he advised. This is the gimmick which Mr. Wilson said would have to be worked out to make the idea practical. Mr. Wilson suggested that legislation might be needed which would enable long-term military contract awards.

The Business Trend

Industry regains stride as all segments of production index move up. Since Korea, durables manufacture has climbed 20 per cent; nondurables are down 3 per cent

PRODUCT-MIX of industry has taken on greater significance in our guns-and-butter economy.

Industrial output, measured by the Federal Reserve Board, remained static in the last three months but increased 10 per cent since June, 1950. FRB's index, seasonally adjusted, was pegged at 219 per cent of the 1935-1939 average in September and October, and probably remained at that point in November.

Components of FRB's index show the trend of production emphasis in the 17 months since war began in Korea. Iron and steel mills have boosted production 13 per cent since June, 1950—and only a fraction of the industry's plant expansions are in operation yet. Nonferrous metals and products output in October was unchanged in total from pre-Korea levels. Aircraft and freight car programs have boosted the transportation equipment component 10 per cent despite the slash in auto production. Machinery output has shown most sensational gain of all; production is up 30 per cent.

The accent on armaments is shown most plainly by comparison of durable and nondurable components. Durables manufacture has climbed almost 20 per cent since June, 1950, and nondurables production has slumped nearly 3 per cent.

STEEL's weekly index of industrial production showed plants were busier in the week ended Dec. 1. All components showed gains, pushing the index up from the Thanksgiving week mark of 201 to 217 per cent of the 1936-1939 average.

Arms Schedules or Hopes?

Charges and countercharges about lagging defense production aren't making relations between various segments of government smoother, but are serving to give the public an idea of where the nation stands. Even if military production is climbing at a $1 million-a-month clip, these programs are still behind schedule: Guided missiles, tanks, aircrafts and electronics. Smoother scheduling and better realization of what must be produced first are now speeding output. Government leaders are now saying arms schedules were only hopes to begin with.

A look at dollar volume of defense spending shows that the biggest rise is still ahead. By mid-1953, the peak of armament buying will be reached. Annual spending rate then will be about $62 billion. Mid-1952 annual rate will be close to $52 billion. To give an idea of the jump, annual rate of pre-Korea defense expenditures was a little over $11 billion and in mid-1951 amounted to $29 billion.

Going Great Guns . . .

Another subject of debate in government circles is steel supply and demand. The question is academic to steel producers; they're pushing production facilities to the limit. In the week ended Dec. 8, mills were scheduled to turn out 2,071,000 net tons of steel for ingots and castings, according to American Iron & Steel Institute. That's 8000 tons less than

BAROMETERS of BUSINESS

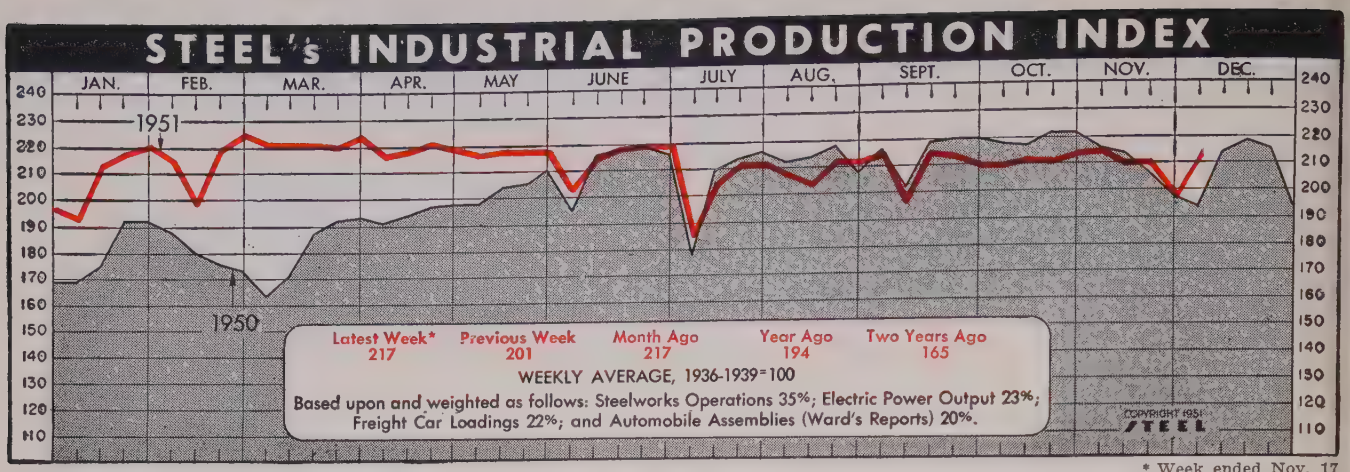
		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	103.5	103.0	104.0	81.5
	Electric Power Distributed (million kilowatt hours)	7,476	7,157	7,319	6,716
	Bituminous Coal Production (daily av.—1000 tons)	1,683	1,918	1,922	1,528
	Petroleum Production (daily av.—1000 bbl)	6,310	6,232	6,288	5,825
	Construction Volume (ENR—Unit $1,000,000)	$179.3	$163.1	$209.8	$260.3
	Automobile and Truck Output (Ward's—number units)	117,224	86,313	118,743	152,140
TRADE	Freight Car Loadings (unit—1000 cars)	850†	711	838	740
	Business Failures (Dun & Bradstreet, number)	148	149	143	160
	Currency in Circulation (in millions of dollars)‡	$28,742	$28,701	$28,410	$27,543
	Department Store Sales (changes from like wk. a yr. ago)‡	+11%	+2%	+5%	−3%
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$14,937	$18,828	$16,409	$13,009
	Federal Gross Debt (billions)	$259.5	$258.1	$258.3	$257.0
	Bond Volume, NYSE (millions)	$13.5	$11.1	$12.1	$21.0
	Stocks Sales, NYSE (thousands of shares)	6,743	4,942	8,142	12,212
	Loans and Investments (billion)†	$72.7	$72.5	$72.6	$69.7
	United States Gov't. Obligations Held (millions)†	$31,524	$31,457	$31,940	$33,306
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	157.76
	STEEL's Nonferrous Metal Price Index‡	234.9	234.9	234.9	240.7
	All Commodities†	177.6	177.2	177.0	172.6
	Metals and Metal Products†	190.9	190.9	190.9	180.4

* Dates on request. † Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.

† Preliminary. ‡ Federal Reserve Board.

† Member banks, Federal Reserve System.

† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100. †† 1935-1939=100.



* Week ended Nov. 17

were produced in the preceding week but 132,600 tons more than were turned out in 1950's corresponding week, when industry was digging itself out from under the "big snow."

No Records Shattered . . .

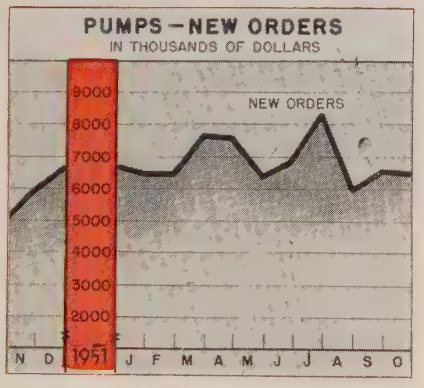
The 5-millionth U. S.-built passenger car of 1951 was included in November production totals of 358,500 cars and 94,500 trucks. That number isn't record-shattering though: In 11 months last year, autobuilders had over 6 million cars completed. Drive for greater volume following holiday closings netted a 40 per cent production gain in the week ended Dec. 1, says *Ward's Automotive Reports*. U. S. and Canadian plants combined to turn out 117,224 cars and trucks. Optimism prevails among truck producers. *Ward's* predicts truck makers will attain over 1.4 million completions in 1951. Sales outlook for both cars and trucks should continue encouraging into the first quarter.

Workers Are Restless . . .

Restlessness of workers as a new wage round takes shape is seen in the rise in labor-management disputes in October. Strikes in that month totaled 440 (as against 400 in September and 550 in October, 1950) says the Bureau of Labor Statistics. Workers engaged in new strikes numbered 240,000, up 40,000 in the month. Total idleness rose from 2,400,000 man-days in September to 2,750,000 in October. Three large strikes caused almost 20 per cent of the October idleness.

Business Foundation Solid . . .

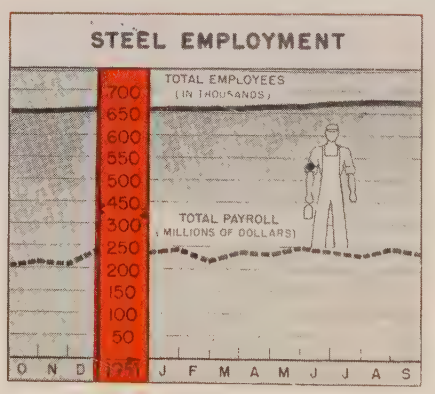
Manufacturers' shipments and new orders increased during October, says Office of Business Economics. Inventory accumulation slowed and unfilled orders remained stable. Sales rose 6 per cent over both month-before and year-ago rates. Durable goods industries—up 9 per cent—



Pumps, New Orders
In Thousands of Dollars

	1951	1950	1949
Jan.	6,477	2,586	3,390
Feb.	6,480	2,938	3,247
Mar.	7,654	3,313	3,593
Apr.	7,583	3,376	2,699
May	6,371	3,668	2,775
June	6,852	4,153	3,019
July	8,358	4,080	3,358
Aug.	5,911	6,429	3,767
Sept.	6,552	5,191	2,914
Oct.	6,506	4,985	2,539
Nov.	....	5,961	2,525
Dec.	....	6,720	2,560
Total	....	53,400	36,386

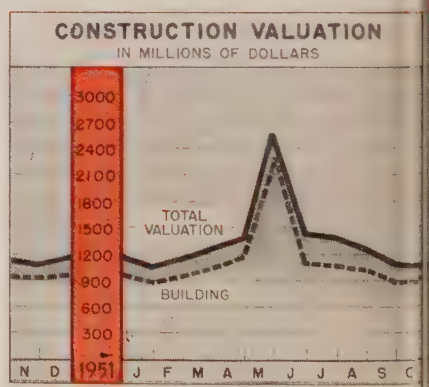
Hydraulic Institute.



Steel Employment, Payrolls

	Employees† in Thousands		Payrolls in Millions	
	1951	1950	1951	1950
Jan.	657	609	$245.3	$189.3
Feb.	663	613	219.4	174.7
Mar.	663	616	238.3	190.0
Apr.	666	621	234.8	186.2
May	667	628	249.0	199.9
June	674	636	240.7	195.3
July	678	643	231.9	188.7
Aug.	679	649	247.7	206.6
Sept.	677	650	236.3	203.8
Oct.	....	650	....	212.2
Nov.	....	653	....	208.0
Dec.	....	657	....	235.0

† Monthly average. American Iron & Steel Institute.



Construction Valuation
(37 States)—In Millions of Dollars

	Total		Building	
	1951	1950	1951	1950
Jan.	1,043.2	730.9	881.9	578.8
Feb.	1,140.5	779.5	962.3	627.0
Mar.	1,267.4	1,300.2	1,043.8	1,075.3
Apr.	1,375.0	1,350.5	1,108.9	1,123.5
May	2,573.0	1,347.6	2,295.0	1,083.0
June	1,408.9	1,345.5	1,098.4	1,072.0
July	1,379.8	1,420.0	1,084.7	1,162.2
Aug.	1,262.8	1,548.9	1,043.5	1,295.1
Sept.	1,082.9	1,286.5	884.2	1,048.3
Oct.	1,051.4	1,135.8	914.4	956.7
Nov.	.....	1,087.1	.....	931.6
Dec.	.....	1,169.4	.....	969.0
Total	.....	14,501.1	.....	11,922.5

F. W. Dodge Corp.

Charts—Copyright 1951, STEEL

showed most improvement, but nondurable sales were also up 4 per cent. Sharp increase in new commitments recorded by primary metal producers contributed largely to the 14 per cent rise in durable goods orders—substantially more than is seasonal. A $200 million addition to backlog of durable-goods industries was offset by a drop in nondurables backlog, leaving unfilled orders at September levels but below the August peak. Rate of inventory accumulation dropped for the second consecutive month and was about half as large as the average accumulation in the previous six months. The entire book value increment was in durable goods. Stocks held by manufacturers increased about $200 million in book value, compared with a $500 million rise in September.

Showing Controls Effects . . .

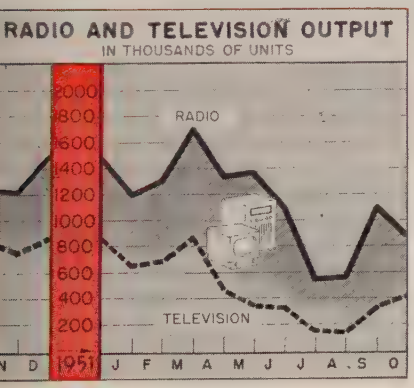
October shipments of fabricated structural steel set the second-highest mark of the year, 241,411 tons. In the first ten months of 1951, shipments at 2,281,374 tons are 22 per cent over the corresponding period of 1950. Bookings for October, 182,894 tons, were down slightly from September, showing the effect of government controls. Backlogs of orders on Nov. 1 amounted to 2,640,851 tons.

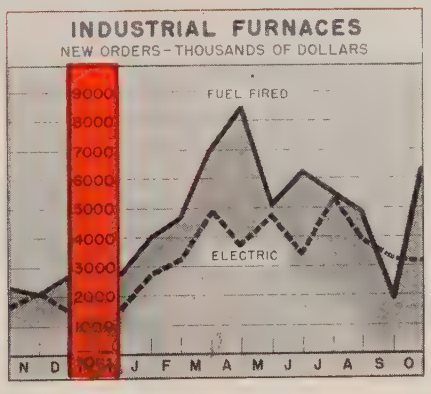
Trends Fore and Aft . . .

Present legal limit on national debt is $275 billion. If the treasury deficit is as high as expected, the ceiling will be raised . . . Total consumer credit outstanding at the beginning of November amounted to $19.5 billion . . . American Gear Manufacturers Association index for October increased nearly 12 per cent to 703.4 per cent of the 1935-1939 average . . . October building permit values dropped to the lowest level in 8 months . . . Steel forgings shipments for September showed the first daily-average gain since May . . . Individual income taxes accounted for 52 per cent of total federal tax revenues; corporations furnish 34 per cent and excises provide 11 per cent . . . The government won't abandon issuance of its old cost of living index, as planned.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Durable Goods Oct.8	Indus. Production ..Nov.19	Refrigerators Nov.26
Employ., Metalwkg.Nov.12	Ironers Nov.5	Steel Castings Dec.3
Fab. Struc. Steel...Nov.12	Machine Tools Dec.3	Steel Forgings Nov.26
Freight Cars Nov.19	Malleable Castings.Nov.26	Steel Shipments ...Nov.5
Foundry Equip. ...Nov.12	Prices Nov.19	Vacuum Cleaners ..Dec.3
Furnaces, W. Air...Nov.19	Purchasing Power...Oct.8	Wages, Metalwkg. ..Oct.22
Gear Sales Nov.5	Ranges, Gas Dec.3	Washers Nov.5
Gray Iron Castings.Nov.26	Ranges, Elec. Nov.26	Water Heaters Dec.3





Radio and Television Output
Thousands of Units

	Radio		Television	
	1951	1950	1951	1950
Jan.	1,203	935	646	439
Feb.	1,313	1,059	679	480
Mar.	1,720	1,349	875	687
Apr.	1,337	1,254	469	543
May	1,373	1,245	339	486
June	1,083	1,491	327	502
July	548	666	152	327
Aug.	563	1,304	147	721
Sept.	1,100	1,335	337	844
Oct.	875	1,230	412	838
Nov.	....	1,216	...	739
Dec.	....	1,506	...	858
Total	....	14,590	...	7,464

Radio-Television Mfrs. Assoc.

Industrial Furnaces
New Orders—Thousands of Dollars

	Fuel Fired*		Electric	
	1951	1950	1951	1950
Jan.	4,033	1,914	2,764	473
Feb.	4,670	616	3,212	697
Mar.	7,019	1,300	4,846	753
Apr.	8,497	837	3,657	415
May	5,044	1,392	4,766	982
June	6,259	1,166	3,370	1,328
July	5,303	2,247	5,587	1,445
Aug.	4,850	3,927	3,891	1,039
Sept.	1,821	1,817	3,250	1,485
Oct.	6,374	2,306	3 172	1,603
Nov.	....	2,068	....	2,157
Dec.	....	2,749	....	1,505

* Except for hot rolling steel.
Industrial Furnace Mfrs. Assn.

On any metal finishing problem

DEPEND on DU-LITE TO CUT COSTS

Courtesy Artistic Wire Products Co.

Graphitic compound, grease and oil made these wire dish strainers tough to prepare for plating. Upon using Du-Lite's #31 Cleaner, the strainers were thoroughly cleaned, and surfaces prepared for plating, with a saving of 1000 lbs. of cleaning compound per month.

What's YOUR problem?

Du-Lite's service to industry is complete from research on specific metal finishing problems to installation of processing equipment. Du-Lite's line includes cleaners, strippers, blacking agents, wetting agents, passivating agents, rust preventatives, burnishing compounds etc. for any type of metal.

See your nearest Du-Lite Field Engineer or write for more information.

DU-LITE CHEMICAL CORP.
MIDDLETOWN, CONN.

Rush information on your products for finishing following metals:

Aluminum..... Steel..... Stainless Steel.....
Brass..... Copper..... Zinc.....
Others.....
Name.....
Company.....
Address.....
City ..... Zone..... State .....

Du-Lite
METAL FINISHING SPECIALISTS

5 METALS IN PRECISION-MADE REEL MACHINED WITH ONE SUNICUT OIL

The Ocean City Manufacturing Company operates Brown & Sharpe automatics on free-turning brass, aluminum, cold-rolled steel, phosphor and hardware bronze. Having used Sunicut Cutting Oils since 1941 with complete satisfaction, the plant decided a year ago to find out what other products could do. Numerous competitive oils were tested, and the best was selected for a long trial run.

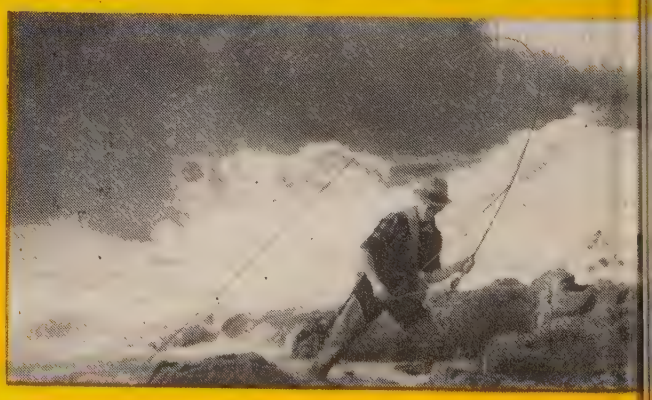
But this oil did not prove satisfactory in actual use. It caused the gibs to corrode and the slides to stick. Operators found miking difficult. Downtime and rejects grew to disturbing proportions. Finally, to protect its automatics and restore its production efficiency, the plant decided to go back to Sunicut Cutting Oils and standardized on Sunicut 11.

Sunicut 11 is a "Job Proved," dual-purpose cutting oil for automatic screw machines. Its transparency permits quick and accurate miking. Among its virtues is the fact it will not stain brass. It drains rapidly, minimizing carry-off. And its high lubricating and cooling properties aid in prolonging tool life and improving finishes. Moreover, it protects finished parts from rust and corrosion. For other outstanding cutting oil case histories write for booklet S-12.

MACHINE: Brown & Sharpe No. 2G • **METAL:** 11 ST aluminum
OPERATIONS: Feed stock, center drill, counterbore, recess and countersink, tap, form and cut off • **SFPM:** 800 • **SPEED:** 3,150 rpm
PRODUCTION: 250 collar housings per hr. • **CUTTING OIL:** Sunicut 11

MACHINING PARTS for Ocean City's "90" Automatic Reel. Sunicut 11 does not corrode the bronze gibs of the automatics, minimizes carry-off, makes miking easy. A coolant tried as an "economical" replacement failed on all three counts.

THIS AUTOMATIC REEL contains six types of metals . . . free-turning brass, aluminum, cold-rolled and stainless steel, phosphor and hardware bronze. Another Sunicut grade is used on the stainless steel.



THE PRECISION PARTS that Sunicut 11 helps to make possible are put to the test as this top-quality reel goes into action. Little does the fisherman know how much of his pleasure he owes to a cutting oil.

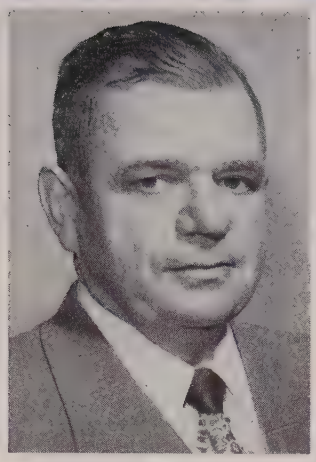
SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO®

Men of Industry

ROGER W. BERRETT
. . . American Steel & Wire purchasing



H. W. BRADLEY
. . . gen. supt. of Newport Steel's sheet mill

JOHN G. BUCUSS
. . . president of new Acme Steel division

Roger W. Berrett was appointed purchasing agent for **American Steel & Wire Co.,** Cleveland, subsidiary, U. S. Steel Corp., to succeed **Frank E. Chesney,** retired after nearly 40 years of association. Mr. Berrett joined the wire company in 1926. Following a series of promotions in the mechanical department at Worcester North Works, he was transferred to the purchasing department, Cleveland, in 1937. Since April he has been senior assistant purchasing agent.

Following election of **Raymond E. Olson** as president, **Taylor Instrument Cos.,** Rochester, N. Y., announces the following promotions: **Frank S. Ward,** industrial sales manager since 1945, succeeds Mr. Olson as general sales manager in charge of sales to the chemical and petroleum industries. **George E. Heller** was made manager of the new industrial sales division handling products for the chemical industry. **Richard N. Pond** becomes a divisional sales manager handling industrial instrumentation for the petroleum industry.

E. M. Slonaker was elected vice president-sales, **Willard Storage Battery Co.** of Calif., subsidiary of Willard Storage Battery Co., Cleveland. He has headquarters in Los Angeles. Mr. Slonaker previously was manager of related products for the parent company in Cleveland.

Eugene F. McCarthy returned to his position as vice president of **Beals, McCarthy & Rogers Inc.,** Buffalo steel warehouse and industrial supply firm. He was on leave from the company as director of NPA's General Components Division.

H. W. Bradley was appointed general superintendent, sheet mill section, **Newport Steel Corp.,** Newport, Ky. **C. D. Hazen** becomes superintendent of engineering and maintenance.

John L. Hallman was appointed district sales manager at Philadelphia for **Alan Wood Steel Co.** to fill the vacancy created by retirement of **Horace W. Merriman. Joseph Toth** was transfered from the general sales department to Philadelphia.

National Lead Co. appointed **Paul J. Pater** manager of its Chicago branch to succeed the late **Walter P. Carroll.** Mr. Pater was assistant manager. **Robert J. Kovas** was named assistant branch manager in charge of metal department sales, and **William E. Williams** assistant manager, Kirksite die and engineering department. **Philip W. Ruppert** was appointed assistant manager of the metal department in New York.

Willis B. Boyer and **Clyde L. Whitaker** were appointed assistant treasurers of **Republic Steel Corp.,** Cleveland.

J. F. Weiffenbach was elected vice president of manufacturing, **Canadian Locomotive Co. Ltd.,** Kingston, Ont., affiliate of Fairbanks, Morse & Co. He was manager of engineering at the parent company's Beloit, Wis., works.

Edward C. Lipman was named a director of **Caterpillar Tractor Co.,** Peoria, Ill., to fill the vacancy created by the recent death of **Raymond C. Force.** Mr. Lipman is president of Emporium Capwell Co.

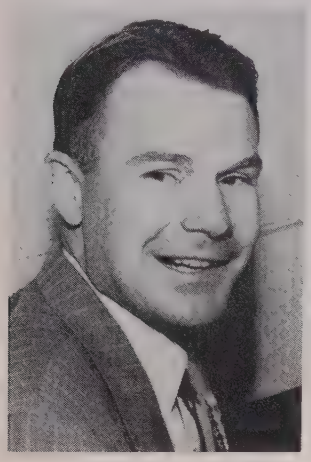
John G. Bucuss was named president of Acme Steel Co.'s newly formed **Acme Steel Products Division** which, effective Jan. 1, 1952, will operate as an independent sales and distributing company for steel strapping, tools and accessories, stitching wire and equipment, as well as other related industrial strip steel products. Previously these products were sold through the company's internal consumer products division. Sales of strip steel and special products will remain with the parent company as will all manufacturing and production operations. Mr. Bucuss formerly was general manager of the strapping division. Assisting him as vice president, stitching wire, will be **F. Raymond Grove Sr.,** former general manager, stitching division. **Percy L. Dafoe,** previously central area manager, was appointed vice president and general sales manager of the new division. Field sales officers will be: **Homer H. Clark,** vice president, eastern area, New York; **Squire J. Johnson,** vice president, Pacific Coast area, Los Angeles; **W. Sheridan Huss,** vice president, southern area, Atlanta; and **John W. Karstens,** vice president, central area, Chicago.

Niles J. Thompson was appointed engineering and development director of Automotive - Starting Division, **Gould-National Batteries Inc.** He is located in Depew, N. Y. He formerly was production manager at St. Paul.

John G. Nelson, assistant secretary and assistant treasurer of **American Steel & Wire Co.,** Cleveland, subsidiary, U. S. Steel Corp., retired after more than 42 years of service. He is succeeded by **Don W. Ryan,** at-

torney on commercial matters in the company's legal department.

W. A. Tweedie, former chief industrial engineer, Texas Engineering &



W. A. TWEEDIE
. . . factory mgr. of Luscombe Airplane

Mfg. Co. Inc., Dallas, was named factory manager of **Luscombe Airplane Corp.,** Temco subsidiary in Garland, Tex. He was associated with North American Aviation Inc. for many years before joining Temco in 1950.

F. J. MacDougall, since 1945 office supervisor in **Allis-Chalmers Mfg. Co.'s** purchasing division, Milwaukee, was named assistant to the director of purchases. **Ray E. Lewin,** an assistant purchasing agent of electrical equipment, replaces Mr. MacDougall as office supervisor.

Servel Inc., Evansville, Ind., promoted four executives in its purchasing department. **Ralph L. Weiss** becomes purchasing agent; **Fred G. Krach** and **James E. Young** were appointed assistant purchasing agents; and **W. J. Pierre** becomes supervisor of purchasing follow-up.

Winthrop Sargent Jr. was elected a member of the board of directors, **National Lead Co.,** New York.

A. K. Neff was appointed sales manager, electronic components division, **Stackpole Carbon Co.,** St. Marys, Pa. **V. E. Gerber** was promoted to assistant to the sales manager, and **Don L. Almquist** to assistant to the manager.

Arthur Colton Co., division of Snyder Tool & Engineering Co., Detroit, made the following additions and changes in its sales personnel: **Warren I. Smith,** connected with the New York office as sales engineer for the last two years, is now in charge of that office, and **Thomas Casey** and **Bruce Winner** were added as sales engineers. **William F. Schafer** was appointed Philadelphia sales representative, **Gordon W. Covey** was placed in charge of the new Chicago branch office, and **T. R. Cochran** is representative for northern California, Oregon and Washington territory. The New England territory now is part of the New York office.

C. Howard George, vice president, was elected a director of **New Jersey Zinc Co.,** New York, succeeding **William Woodward,** resigned. **Edward E. Schwegler** was elected comptroller to succeed **Frederick H. Baxter** who retains his title as vice president of the company.

John P. Cleveland was appointed a sales representative for **Soss Mfg. Co.'s** invisible hinges, in Indiana.

Joseph A. Richter Jr., former chain

JOSEPH A. RICHTER JR.
. . . heads service for Disston's power tools

saw specialist in the market requirements department of **Henry Disston & Sons Inc.,** Philadelphia, was named manager of service for the power tool division. He succeeds **Joseph T. Thayer** who was promoted to sales engineer for Disston's overall operation.

Earl R. Narum has been assigned to the Detroit district office of **Allis-Chalmers Mfg. Co.'s** general machinery division as an application engineer.

S. Vernon Travis was appointed manager of the newly established sales standards section of **General Electric Co.'s** apparatus sales division.

Vernor L. Barbor Jr. has joined the staff of **Exothermic Alloys Sales & Service Inc.,** Chicago. He formerly was with Drake Steel Supply Co. and Kaiser Steel Co. **Carl L. Mc-Vicker,** formerly open-hearth metallurgist at Algoma Steel Corp. Ltd., is now with Exothermic as representative in the Chicago area.

W. J. Scott is the newly appointed corporate accountant of **Lockheed Aircraft Corp.,** Burbank, Calif., to replace **T. G. Hawkins,** resigned.

National Lead Co., New York, elected **George A. Dewey** comptroller, **Thomas J. Owens** and **Archer D. Sargent,** assistant comptrollers of the company. Mr. Sargent continues as comptroller of the Atlantic and Philadelphia branches, to which positions he was named last February.

George Miller was made advertising director of **Caloric Stove Corp.,** with headquarters in Philadelphia.

Robert E. Cook, field engineer with **Timken Roller Bearing Co.'s** Cleveland office, was named sales engineer of that office's steel and tube division.

Link-Belt Co. appointed **W. J. Brinkworth** as representative, distributor sales, southwestern division, with headquarters at the Houston plant.

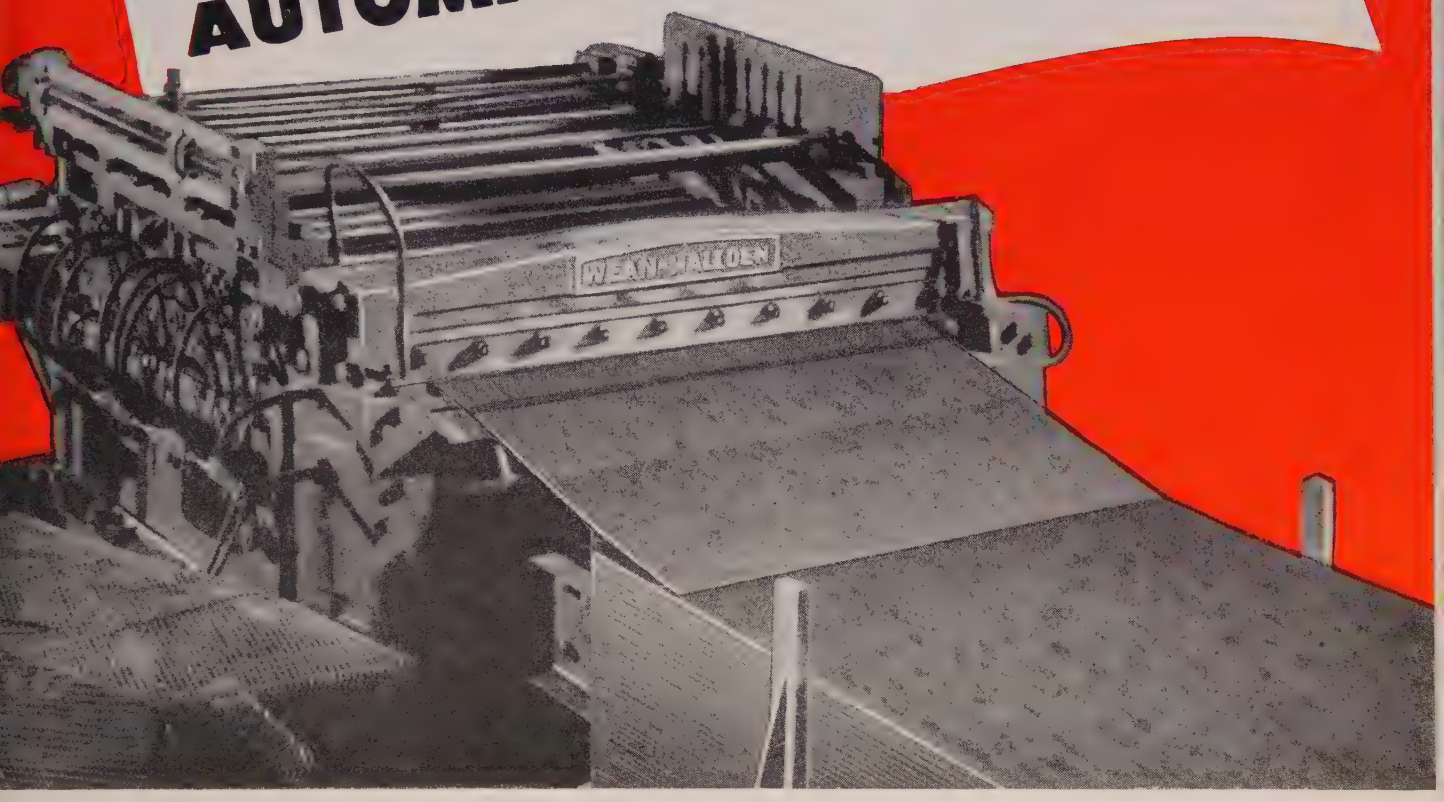
Marlan E. Martin was promoted to purchasing agent for western operation of the newly consolidated Canning Machinery Division of **Food Machinery & Chemical Corp.,** San Jose, Calif. For the last five years Mr. Martin was associated with Canning Machinery Division and one of its predecessor units, Anderson-Barngrover Division.

Harry H. Yeager was appointed general superintendent of plant opera-

HARRY H. YEAGER
. . . gen. supt. Harbison-Walker Refractories

tions, **Harbison-Walker Refractories Co.,** Pittsburgh. He has been associated with the company's operating department since 1905, and served

Wean-Hallden
LOW COST SYNCHRONIZED AUTOMATIC SHEAR LINES



THE installation of a Wean-Hallden Synchronized Automatic Shear Line assures you the most efficient shearing operation available today. The Wean-Hallden, while actually requiring *less floor space*, delivers up to *twice the production.*

Infinite variable lengths from 12-inches to 12-feet at speeds up to 200 FPM with accuracy better than commercial tolerances means faster production, reduced labor costs and minimum scrap loss for you. *Before You Buy—Investigate Wean-Hallden.*

Wean *Equipment Corporation*
CLEVELAND, OHIO

until recently as general district superintendent with headquarters in Pittsburgh.

E. A. Purnell was elected to the board of directors of **General Fireproofing Co.**, Youngstown, to fill the unexpired term of the late **W. H. Foster.** Mr. Purnell is vice president-sales.

Donald R. McComb was named advertising manager, **Warner Electric Brake & Clutch Co.**, Beloit, Wis.

John E. Kelderhouse was appointed district secretary for the newly created north central district of **Liquefied Petroleum Gas Association**, Chicago. During the last year he operated his own business as a representative for manufacturers of gas heating and cooking equipment.

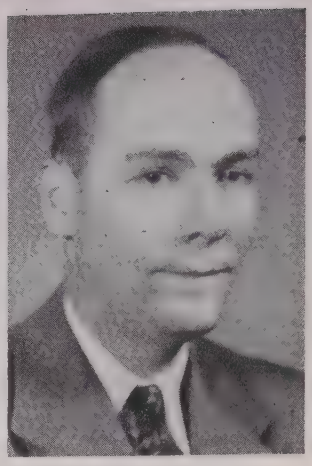
Electric Furnace Co., Salem, O., appointed **Charles J. Paumier** as its Pacific Coast representative. He formerly was connected with Revere Copper & Brass Co. Mr. Paumier has opened offices in the Bank of America building, Los Angeles.

Ralph W. Sponseller Jr. was appointed a sales representative in the Detroit branch of **Berger Mfg. Division, Republic Steel Corp.** He will handle sales of Berger's shelving, lockers, office equipment and special products.

Ralph F. Johnson has retired as vice president and treasurer of **Buffalo Tank Corp.**, Buffalo. He was one of the founders of the firm in 1928.

Dr. Henry C. Rosenberg was added to the research staff of **Dearborn Chemical Co. Ltd.**, Toronto, to assist **Dr. W. A. James**, director of research.

Cast Iron Soil Pipe Institute, Washington, appointed **Homer E. Robertson** executive vice president. Prior to his appointment Mr. Robertson was vice president-sales, Somerville Iron Works, Newcastle, Pa.



JOHN L. FULLER
. . . research services at Reliance Electric

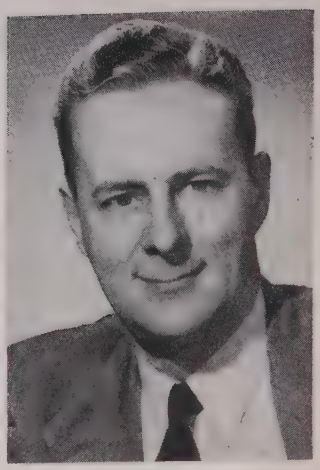
Reliance Electric & Engineering Co., Cleveland, promoted **John L. Fuller** to the newly created administrative post of manager of research and technical services. Since September, 1950, he has been technical co-ordinator in the engineering department.

Gerald W. Coleman was appointed to the new position of eastern district sales manager of **Fleet of America Inc.**, aluminum window manufacturer. **Robert M. James Jr.** was named Buffalo district sales manager to succeed Mr. Coleman.

Warren G. Rosendahl was named assistant general manager of **Clearing Machine Corp.'s** new Hamilton, O., division. He formerly was an officer of Hamilton - Thomas Corp., from which Clearing Machine recently purchased the plant it now occupies in Hamilton.

Daniel J. Duffin was appointed to the public relations department of **American Locomotive Co.**, New York.

D. R. Waugh was appointed general sales staff manager, **Columbia Steel Co.**, San Francisco, subsidiary, U. S. Steel Corp., replacing **Charles L. Hamman**, resigned.



KENNETH W. DONLE
. . . chief metallurgist of Tube Reducing

Kenneth W. Donle was appointed chief metallurgist, **Tube Reducing Corp.**, Wallington, N. J. Since 1939 he has been with National Tube Co., a subsidiary of U. S. Steel Corp., and for the last six years held the position of assistant chief metallurgist at its Gary, Ind., plant.

National Electric Products Corp., Pittsburgh, appointed **Henry V. Ivory** plant manager of its newly purchased Elizabeth, N. J., plant.

Joseph H Lancor Jr. was appointed director, transducer division, **Consolidated Engineering Corp.**, Pasadena, Calif. He has been director of product engineering of Vitro Corp. of America, the former Kellex Corp., and before that was research engineer for Sperry Gyroscope Co.

Richard L. Farr was appointed to the newly created position of personnel administrator of **Yale & Towne Mfg. Co.**, New York. He formerly was personnel administrator for Koppers

Thomas G. Lanphier Jr. was elected vice president, **Consolidated Vultee Aircraft Corp.**, San Diego, Calif. He joined Convair last April as an assistant to the president.

OBITUARIES...

Alexander L. Geitner, 60, founder and president, **Genesee Mfg. Co.**, Rochester, N. Y., maker of production tools, died Nov. 25. He founded the company in 1908.

Charles H. Wolfe, 64, a former executive of **Aluminum Co. of America**, Pittsburgh, died Nov. 28. He was Pittsburgh district sales manager for many years, and retired in 1948.

Henry L. F. Trebert, former general superintendent, **E. C. Stearns Co.**, Syracuse, N. Y., died recently. He was a pioneer in the gasoline engine field.

Walter A. Lausterer, 48, president of **Walter A. Lausterer Inc.**, Philadelphia, tool manufacturer, died Nov. 29.

Elmer H. Horstman, 52, chief engineer for the steam turbine section of **Allis-Chalmers Mfg. Co.'s** power department, Milwaukee, died Nov. 24 of a heart attack. Mr. Horstman was a specialist in dynamic problems of rotating machinery. He was called to Germany in 1945 to serve as a scientific consultant on power plant equipment for United States occupation authorities. He became chief engineer of the section in 1948, and had been with the company for many years.

Armen A. Beer, 35, treasurer of **Badger Bearing Co.**, Milwaukee, died Nov. 25.

Robert T. Ward, 34, priorities supervisor for **Allis-Chalmers Mfg. Co.**, Milwaukee, died Nov. 26 after a short illness.

Production AND Engineering NEWS AT A GLANCE

METAL BUILDUP—New spray-forming technique for fabricating large, complex parts of high melting point metals was recently uncovered by M.I.T. researchers working on a Navy project. Starting with the exact process by which a sprayed-metal deposit is built up they evolved the spraying method. It consists of first spraying the metal onto a core of the desired shape, then sintering the sprayed deposit to form a dense, strong part. Advantages: It's inexpensive, simple and could be used on shapes that are hard to fabricate by conventional processes.

NITRIC ACID FROM THIN AIR—Nitrogen from the air is being converted into nitric acid, vitally needed in the manufacture of many explosives and propellants. An extraction process, now commercially operable, requires only air, water and energy for raw materials; equipment consists of a square horseshoe-shaped furnace and a recovery unit. Air is blown over hot high purity magnesium oxide pebble beds, preheated there to make possible higher temperatures and forced around the top of the horseshoe to come in contact with fuel gas burning at about 4000°F. At 4000° about 2 per cent of the air is converted into nitric oxide. This mixture continues down through another pebble bed where pebbles absorb the heat so quickly that the nitric oxide is "frozen" before it has time to revert back to nitrogen and oxygen. When the pebble bed absorbing the heat reaches a certain temperature, the cycle is reversed, making the first heating bed the cooling bed.

1000 TONS PER DAY—Monthly production at Babcock & Wilcox Co.'s direct steel casting plant in Beaver Falls, Pa. is averaging from 750 to 1000 tons. The installation handles 175 tons per day, pouring at the rate of 20 tons per hour. Starting Oct. 29, the casting machine processes three heats per day ranging from 10,000 to 15,000 pounds per heat with bar production from 9800 to 12,000 pounds per heat.

SMOKELESS STEAMERS—Smoke emission from coal-burning lake carriers will be well below the nuisance level when a research program sponsored by BCR and GLAPAP finally pays off. Equipment being installed on stoker-fired water tube boilers will not need replacement; nor are extensive changes to basic equipment required. Overfire jets used industrially also work effectively on the vessels. As for hand-fired Scotch Marine boilers, the smoke abatement problem remains unsolved. The lake vessel fuel market amounts to about 3 million tons of bituminous coal annually. BCR and GLAPAP? Bituminous Coal Research Inc. and Great Lakes Air Pollution & Smoke Abatement Program.

MISCHMETAL FOR MALLEABILITY—Austenitic chrome-nickel and high alloy stainless steels can be made more hot-workable by adding rare earths as alloying elements. Working with cerium and lanthanum, two elements commonly associated together in mischmetal, three Carpenter Steel metallurgists improved hot-workability of such alloys as type 310 (26 per cent chromium, 19 to 22 per cent nickel.) Normally this grade is slightly hot-workable, but in many cases it is very hard to hot-work. A mischmetal addition of 4 pounds per ton in the arc furnace and 8 pounds per ton in an Ajax increased average billet yields of square and round bars by 6.7 per cent. p. 88

ROCKETS CLIMB HIGHER—Miniaturized instruments have added 7 miles to the climb of a rocket. By cutting down weight of the contained radar signal beacon and other electronic equipment by two-thirds, rockets now reach 60 miles up.

MORE MILITARY STANDARDIZATION—High-mortality gasoline engine parts used by the military will soon be standardized under a program started four years ago. First of 14 firms making engines in 2⅞ to 4⅛ inch bore range showed 138 different models with 15 different cylinder diameters, 1187 different high-mortality parts. These 15 bore sizes have been reduced to five in the 3 to 4-inch range. The experts think they can reduce the number of high mortality components to 63. The program will be expanded to include larger bore sizes in both gasoline and diesel engines. Careful! This simplification might get out of hand!

HIGH TEMPERATURE ALUMINUM—A cast aluminum alloy containing nickel and copper will stand higher temperatures than are permissible with standard light alloys. Aircraft design now requires various cast parts, formerly operating at 200 to 300°F to resist temperatures as high as 600°F. The new material, known as ML aluminum alloy, contains 4 per cent copper, 2 per cent nickel, 2 per cent magnesium and small amounts of chromium, titanium, vanadium and manganese. Tensile strength is about 33,000 psi as cast, at room temperature. At 600°F, however, ML shows a typical strength of nearly 17,000 psi. Heat treatment increases tensile strength to 44,000 psi at room temperature.

Metalworking Outlook—p. 51 *Market Outlook—p. 155*

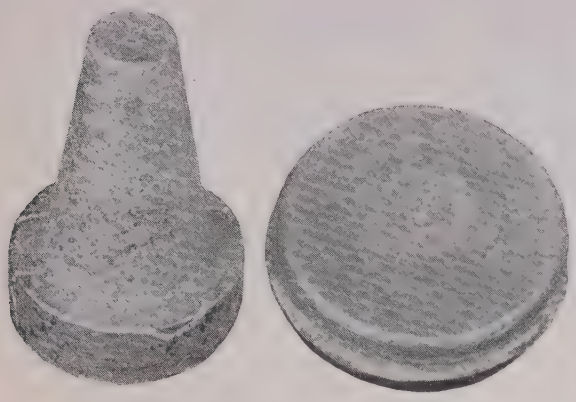
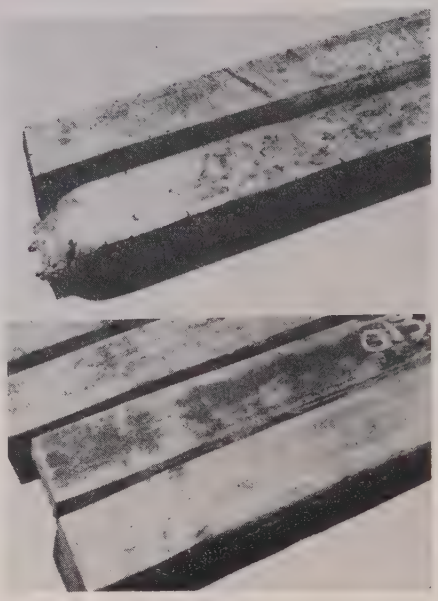


Fig. 1 (above)—Cone test specimen before and after forging

Fig. 2 (right)—Forged 3½-inch squares of 21-12 WN steel. Upper two billets had no misch metal additions; lower four billets had misch metal additions of 2 pounds per ton



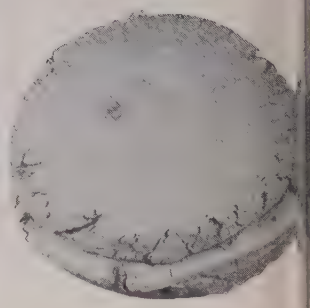


Fig. 3 (above)—Forged cones of 21-12 WN steel demonstrate effect of misch metal additions. Cone at left had no additive, while that on the right had misch metal added at the rate of 2 pounds per ton

Cerium and Lanthanum

IMPROVE HOT WORKABILITY OF

ONE of the more general problems in some grades of stainless steel manufacture is the production of consistently malleable ingots. Hot-workability of any particular stainless grade determines to a large extent its availability as bars, sheets, strip, plates, and other commercial wrought products.

For some years Carpenter Steel Co. has been investigating variables that affect hot-workability of stainless steels, to improve the hot-workability of those steels where some measure of hot-workability presently exists, and to impart hot-workability to stainless alloys previously considered to be non-hot-workable.

Rare earth elements are effective agents in promoting and improving the hot-workability of austenitic chromium-nickel and high alloyed stainless steels when added as an alloying element. Effect of these alloy agents can be exceptionally marked in some alloys where the metal is converted into a commercial wrought product from a metal previously considered to be non-hot-workable. In other metals, the effect will be to improve the existing hot-workability as evidenced by better ingot-to-billet yields, less billet preparation, and better hot-rolled strip surfaces. The term rare-earth elements refers principally to cerium, lanthanum and those other rare-earth metals commonly associated in misch metal.

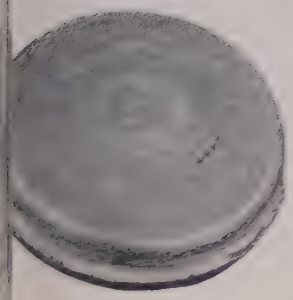
Forgeability Evaluated — To isolate hot working variables so an intelligent study can be made of the hot working problem, some testing procedure with each heat must be devised.

At Carpenter Steel a cone test is used. One or more cone tests are cast with each heat of stainless steel under study. If not much is known of the steel, the cone test will lead to the correct rolling or forging temperature. This is determined by heating up the cones to various temperatures and forging them on a hammer. The forging procedure is as follows:

After the cone is heated to the correct temperature, it is placed on the die of the hammer (a 1½-ton hammer has been used in the experimental work), and a light tap is given the cone to seat it well on its base. Then a full blow of the hammer is given to the cone so that the truncated portion is driven down into the base and spread. An examination of the periphery of the cone allows an estimation of hot-workability.

First experiments had to do with the effect of misch metal alloy addition on the forgeability of austenitic chrome-nickel steels containing nitrogen. One of the early steels for experimentation was an austenitic valve steel of the following nominal composition: C, 0.20 per cent; Cr, 21.00 per cent; Ni, 11.00 per cent; W, 3.00 per cent; and N, 0.20 per cent. Experience with this steel had shown that without nitrogen additions, the steel could be forged and rolled without too much difficulty and could be satisfactorily fabricated into automotive exhaust valves.

Hot-Shortness — Introduction of nitrogen to in-



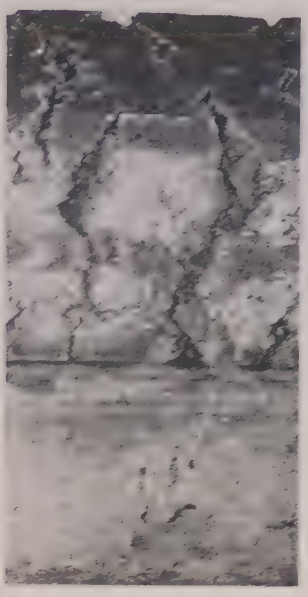


Fig. 4 (right) — These 4¾-inch square billets were forged from 9⅝-inch ingots of a sulphuric acid resisting steel

RARE earths are effective in improving hot-workability of austenitic or partly austenitic grades of stainless steels containing 4 to 70 per cent nickel and 10 to 60 per cent of the chromium, molybdenum and tungsten group, the amount of any one element to the group not to exceed 30 per cent.

Nickel content determines the minimum and maximum amounts of cerium and lanthanum needed.

At any nickel content, a specific alloy can have a critical cerium and lanthanum content narrower than that indicated by the nickel content. This content, however, will be within the broad range determined by the nickel content and will be influenced primarily by such alloys as molybdenum, copper or tungsten.

Alloy additions of cerium and lanthanum in the range of about 0.02 to 0.04 per cent promote better hot workability in high-frequency Ajax and basic electric arc-melted alloys such as types 316, 310, 308.

Alloy additions of cerium and lanthanum in the range of 0.08 to 0.18 per cent achieve hot-workability in such alloys as nickel-chromium-molybdenum-copper and in other high-alloy stainless steels for corrosion resistance and high-temperature strength.

STAINLESS

By C. B. POST, D. G. SCHOFFSTALL and H. O. BEAVER
Metallurgical Department
Carpenter Steel Co.
Reading, Pa.

crease the hot-hardness brought along several manufacturing problems, principally having to do with hot-shortness of the alloy on hammering or rolling. The hot-shortness was studied by the cone test; no improvement could be made in melting practice to make this analysis commercially hot-workable. The introduction of misch metal brought some surprising results on the ductility of the analysis.

Fig. 2 shows the appearance of billets 3½ inches square made from the same Ajax high frequency heat in which several ingots were cast without the introduction of misch metal, followed by several ingots after an alloy addition of misch metal equivalent to 2 pounds per ton. Fig. 3 shows the hot forged cone test specimens corresponding to these two parts of the heat.

A comparison of the appearance of the cone test specimens illustrates the appearance of ductile and nonductile steels on the cone test as compared with their appearance in forged or rolled billets. The percentage yield from ingots to prepared billets ready for rolling is an important economic figure for steel mill operations. In the case of the 21-12WN valve steel, the misch metal alloyed steels showed an average increase in prepared billet yields of about 15 per cent over what had been obtained without the use of misch metal.

How Much Cerium?—The cone test enables considerable experimentation to the done on austenitic stainless steels regarding this question of hot ductility or hot-workability because of the good correlation of the hot working of the cone with the behavior in ingots. This makes it possible to study a variety of melting practices and analyses by means of the cone test to obtain the best possible analysis balance, and in the case of misch metal, cerium and lanthanum contents necessary to obtain the most ductile metal. For instance, each particular analysis requires some experimentation to determine the correct amount of cerium and lanthanum to be incorporated in the metal. This is not so apparent in the low alloyed steels of the 18-8 variety, such as type 304, 316 or 317, but it is apparent in the higher alloyed grades—especially with the higher nickel contents.

At any given nickel content, the critical range of cerium and lanthanum necessary to achieve the best hot working properties can be narrower than the outside range shown in Fig. 5. For instance, Fig. 6 shows the appearance of upset cones for 0.10 per cent C (max), 30 per cent Ni, 20 per cent Cr, and 4 per cent Mo with variable misch metal additions. The critical range of cerium and lanthanum is shown to be 0.06 to 0.49 per cent Ce+lanthanum corresponding to cones C, D, E and F.

Increasing the molybdenum content to 12 per cent requires a more restricted range of cerium and lanthanum to achieve the best hot working properties. This is shown in Fig. 7 for an analysis of 0.10 per

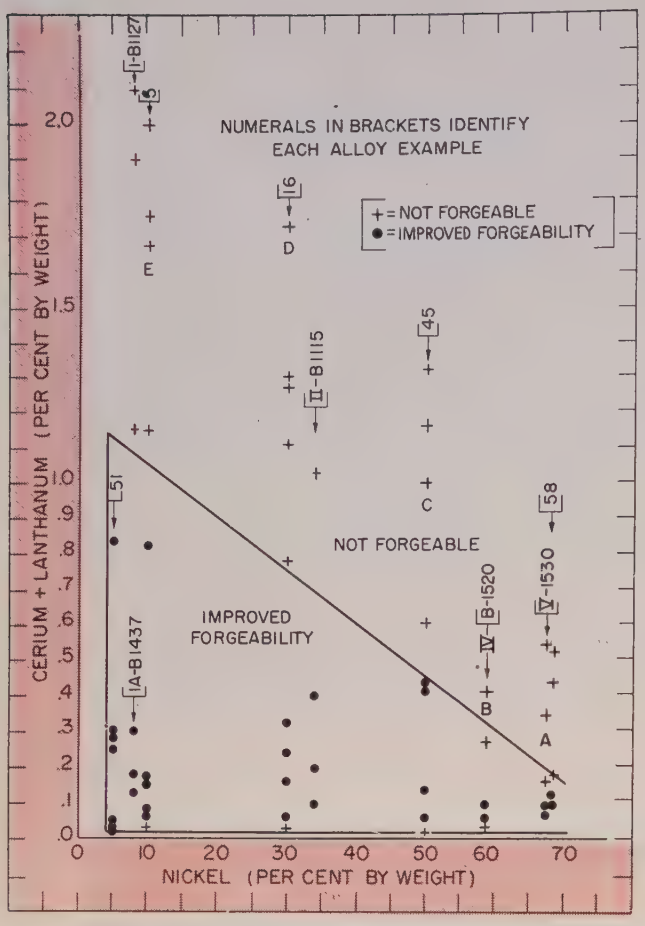


Fig. 5—Effect of nickel content on maximum and minimum amounts of cerium and lanthanum to improve hot-workability in Cr-Ni-Mo stainless alloys

cent C (max), 30 per cent Ni, 20 per cent and 12 per cent Mo when the critical range of cerium + lanthanum is shown to be 0.13 to 0.32 per cent Ce + lanthanum, corresponding to cones D and E.

Nickel Controls—Conclusion to be drawn from these experiments is that the nickel content of austenitic stainless steels containing elements of the group, chromium, molybdenum and tungsten determines the minimum and maximum amounts of cerium and lanthanium necessary to obtain improvements in hot-working (see Fig. 5). But for any analysis the critical cerium and lanthanum contents necessary to improve hot-working can be narrower and will fall within these preferred ranges, depending on the analysis being considered. Here experience or an actual experiment with the cone test will indicate the correct cerium and lanthanum range for best hot working properties.

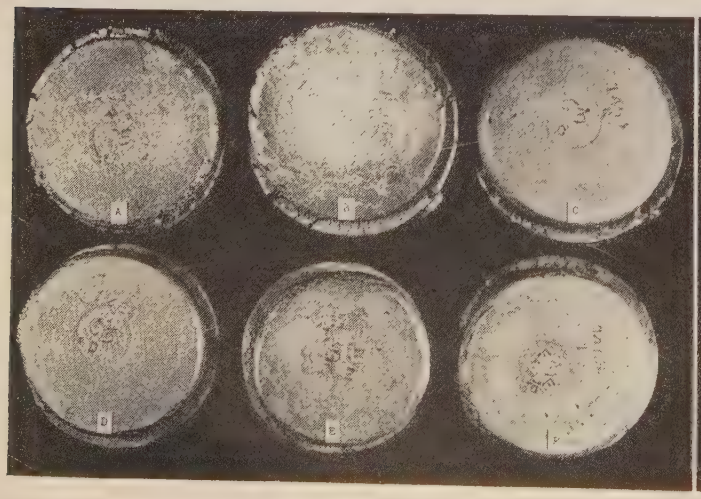
The exact mechanism of misch metal (cerium, lanthanum, etc.) in promoting the hot-workability of these alloys has not yet been determined. In the course of experiments the various ranges of analyses which will be benefited by rare-earth additions have been established. Concentration of rare-earths necessary to improve the hot-ductility of the various alloys is also set. However, in spite of intensive investigation no clear explanation can be given of the deoxidation effects or benefits of the rare-earth additions. There is little doubt that some of the benefits obtained are the result of a certain amount of deoxidation in the bath, which is accompanied by a marked increase in the fluidity of the molten metal. Since the effect obtained depends mainly on the alloy content of rare-earths, it is considered satisfactory to use the alloy content of rare earths as a measure of the final results without a definite explanation of the deoxidation properties.

Arc Melting Studied—As an example of arc melting, type 316 is ordinarily taken to have the following analysis range: 0.10 per cent (max) C; 0.70 (max) Mn; 1.00 (max) Si; 16.00 to 18.00 Cr; 10.00 to 14.00 Ni; and 2.00 to 3.00 Mo. This grade of steel is hot-workable and is available in all the standard wrought products. At its best, this grade is somewhat more difficult to hot work; and preparation losses generally exceed those for type 302 or 304. Different

From data presented at the Electric Furnace Steel Conference, Iron & Steel Division, AIME, Dec. 6-8, 1951.

Fig. 6 (left)—These forged cone specimens are of alloy containing 0.10 per cent maximum carbon, 30 per cent nickel, 20 per cent chromium and 4 per cent molybdenum. Cones C, D, E and F show a marked improvement in forgeability over cones A and B

Fig. 7 (below)—These are forged cone specimens of a 0.10 per cent carbon, 30 per cent nickel, 20 per cent chromium and 12 per cent molybdenum alloy. Forgeability of cones D and E is better than that of cones A, B, C and F



heats can show varying grades of hot-workability, ranging from those heats partially scrapped at the mill and those requiring heavy billet preparation losses to those exhibiting the standard behavior of this grade.

Fig. 8 shows two 4-inch rounds, two 4¾-inch rounds, and two 6⅜-inch squares, hot rolled and pickled billets from a 12-ton arc melted heat of type 316 analyzing: 0.060 per cent C; 1.75 Mn; 17.55 Cr; 0.47 Si; 12.36 Ni; and 2.49 Mo. The misch metal was added to the ladle in an amount corresponding to 2 pounds per ton. These billets were hot rolled direct from a 9⅝-inch square 1000 pound ingot on a fixed pass 22-inch mill. The ingots were heated in an oil-fired continuous heating furnace reaching the rolling temperature of 2350°F in the furnace, optical pyrometer temperature 2120°F at the mill. Appearance of these billets on the surface is as good as any rolling of the standard 18-8 grades of steel. Prepared billet yields for this heat of steel were 5 per cent more than what was considered standard.

Fig. 9 shows a truckload of hot rolled slabs, type 316, made by rolling 9⅝-inch ingots direct to slabs. The heat was alloyed with 2 pounds of misch metal per ton, the steel analyzing 0.011 per cent Ce and 0.011 per cent La. The slabs were then prepared and rolled to strip 7¾ x 0.148 inches. Fig. 10 shows appearance of the hot rolled strip coil. Note the appearance of the edges. There is no sign of corner checking and the edges are as good as those obtained on type 430 and type 304. The yield from ingot weight to hot rolled strip weight increased 6.8 per cent on the addition of misch metal in amounts of 2 pounds per ton addition made in the ladle from basic electric arc metal.

Another grade of arc-melted stainless normally considered difficult to hot work is a grade designated by Carpenter as type 316X. This has the following nominal composition: 0.06 per cent C, 1.75 Mn, 0.40 Si, 18.00 Cr, 9.25 Ni, 2.25 Mo.

Nickel content for the chromium and molybdenum contents is relatively low. This causes about 30 per cent ferrite in the austenitic structure and up until the addition of misch metal the alloy was considered non-hot-workable. The addition of 8 pounds of misch metal per ton to this analysis melted in the Ajax or 4 pounds per ton in the arc furnace enables ingots to be roll-cogged direct to slabs or round or square billets for rerolling into strip. In this case cerium and lanthanum contents of 0.020 per cent and more lead to a commercial product, whereas the alloy without misch metal is not and was not obtainable in wrought products.

Type 308 stainless is another grade that will exhibit the so-called *in and out* hot working properties. In this case, the problem can either be that of the steel being unbalanced chemically or of the steel having hot-short tendencies because of a particular melting procedure. A misch metal addition of 4 pounds per ton in the arc furnace will produce metal with consistently good hot working properties and an average billet yield increase of 4.8 per cent over heats made without misch metal.

Fig. 8 (above)—These are typical of type 316 rolled billets, 6⅜-inch square, 4¾-inch round and 4-inch round from 9⅝-inch ingots; 2 pounds of misch metal per ton of steel was added to the ladle of basic electric-arc furnace metal

Fig. 9—This is a truckload of 7x3-inch type 316 slabs with misch metal additions of 2 pounds per ton, basic electric-arc furnace metal

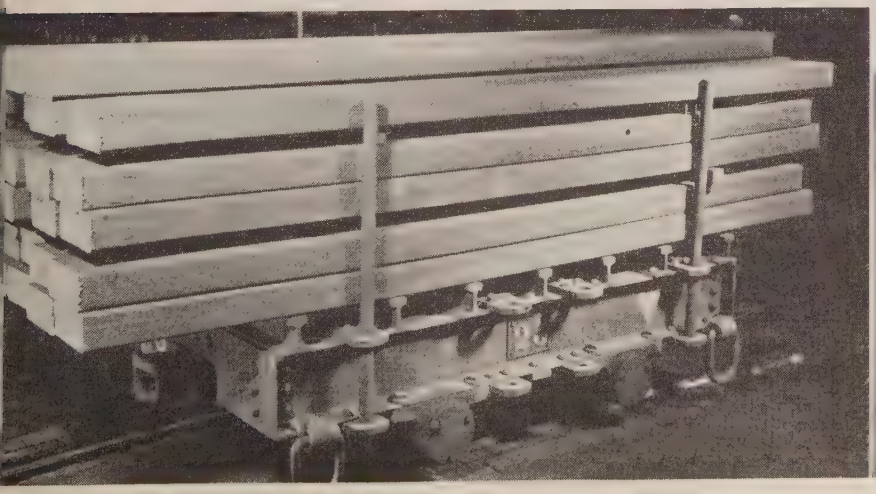
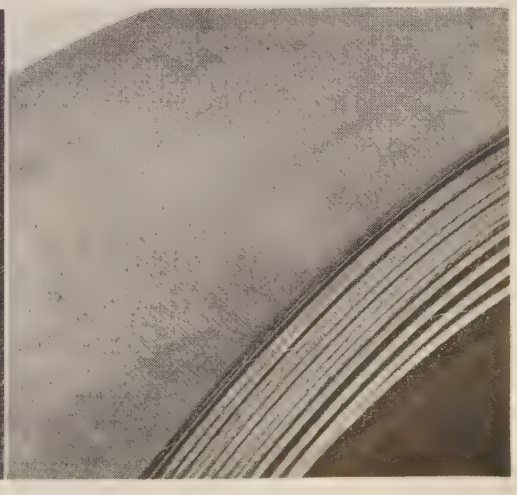


Fig. 10—Hot-rolled strip 7¾ x 0.148-inch, type 316 stainless, made from slabs shown in Fig. 9. There are no cracks along edge of strip



Inventory Control System Effects

Keeping an eye on 250,000 separate production tools and 2,500,000 general purpose tools used in the complex business of building aircraft is a full-time job that can pay off handsomely in solid reductions in processing cost

By HARRY GEORGE
Chief of Tool Control
Glenn L. Martin Co.
Baltimore

HOW have rubber nipples and hypodermic needles come to be considered along with drill jigs, rivet guns and 2-ton drop hammer dies, as standard tools at the Glenn L. Martin plant? The answer lies, first of all, in the complexity of modern aircraft manufacture. The curious diversity of these gadgets is explained, also, by the relentless and wide-ranging search for new ways and means of reducing the product's processing cost in terms of tool crib economies.

The name "tool crib" rather loosely covers the multitude of bins, boxes, drawers, racks, stalls and other such accommodations provided for the storage of both general purpose and production-type tools. But in shop talk, the tool crib means the company's myriad tools, collectively, whether stored in cages or open areas, indoors or out in the factory yard.

Tools in the Millions—Production tools, numbering upwards of 250,000 separate items, have no individual counterparts—since each serves as the pattern for a different manufacturing operation on one or another of the various airframe elements in process. General purpose tools, on the other hand, break down into some 7000 categories representing more than 2,500,000 separate items. This latter figure does not include the Cleco clamps, immense quantities of which must be kept on hand for use on all skin assemblies.

A solid basis for the Martin Co.'s tool crib savings is to be found in the elaborate system of inventory control, which indicates the whereabouts of every unit at all times. Each production tool bears an identification number, be it a 200-square-foot router board or a drill template of postage stamp size. General purpose items, too, are all strictly accounted for—each drill bit, file and air hose, each transit, rivet peen or bench tool.

Central Records Office—Administered from a central records and distribution office, all active tools are stored in one or other of the nearly 40 convenient locations established for them throughout the plant. General purpose tools are kept within wire cages, where a standardized drawer, shelf and counter arrangement promotes the accuracy and speed of tool issuance to personnel on the floor. Production tool stations, which are normally open areas, likewise reflect a planned orderliness. Safety and accessibility were prime factors in the disposition of this material.

Economies in the tool crib may best be pointed up by a few examples, among which the baby nipple adaptation ranks high in ingenuity. The nipple, with its tip cut off, when fitted around the universal joint of a swivel-type rivet peen, holds the ball and socket elements firmly together. In the past, the two parts of the peen became easily separated and were often damaged. Another case involves a rivet peen design which had been outmoded because of its lack of a certain safety feature. There was a considerable stock of these tools on hand. Instead of junking them, the peens were all reworked to embody the improvement in design at half the cost of replacing them.

Close Co-ordination Effective—Numerous tool crib economies have been effected, also, by close co-ordination with the procurement department, as when 1000 drill motors were purchased at 75 per cent off list price, new, and a bargain in bench-type squeezers recently brought an 80 per cent saving. Again, plastic air hose has now replaced the rubber article which may soon be a high-priority item. The quick-disconnect feature saves time, while the smaller diameter and lighter weight of the plastic hose permits easier handling by the operator. Supplanting a pair of such tools by a combined drilling and reaming tool, although it costs somewhat more than the two original items, is paying off in the elimination of an entire manufacturing step.

Preservation of tools against corrosion and surface damage represents another field for thrift. Cutting tools, both new and resharpened, are usually dipped in Plasticote. This substance provides an hermetically tight seal. An alternative is waxed cheesecloth, which

Some of the quarter of a million production tools currently in use in the Martin plant. Racks and aisles are numbered in accordance with an overall system of detailed control

ool Crib Savings

can be used over again. Large steel fixtures, which may be exposed to weathering, receive a sprayed-on coat of Paralketone for protection. Most other production tools, made as they are of such materials as aluminum, magnesium, Kirksite, wood, Masonite or thermosetting plastics, are proof against corrosion.

Cabinets stocked with high-utilization tools, such as rivet guns, squeezers and air screwdrivers, have been set up at all assembly work centers to assure a minimum of idle time away from the job. Trouble stations, where damaged or marginal tools are brought for attention, by affording quick turn-around service on such items, aid a great deal in averting costly bottlenecks on the shop floor. A salvage bench, at the central tool crib office, is maintained for the inspection of worn and damaged items.

Training Program Started—Broken tools are to be expected in every busy plant, and the Martin Co. is no exception. The 200 per cent increase in manpower since 1949 has complicated the problem of minimizing damage due to errors on (*Please turn to Page* 115)

Depot on factory floor, where general purpose tools are issued to operators. Note orderly arrangement of drawers, made standard for all 22 depots throughout the plant

Right, below—Files of all sizes, for all uses, are filed in this section of the tool crib

Right—Rubber nipple with tip cut off applied as casing around universal joint-type rivet peen, holds ball and socket together. Photo shows operation on stringer of P5M-1 Martin flying boat

Below—Large-size production tools in storage. Operator in foreground is applying protective spray-coating to steel master gage for aircraft wing

ROBOT MACHINIST

Operates Machine Tools by Remote Control

A "robot machinist" that will operate a machine tool from an engineer's office or other distant point has been developed by Daco Machine & Tool Co., Brooklyn, N. Y. Remote control possibilities are practically unlimited. It would be possible to have the robot located in Detroit, for example, and by it operate, via teletype, machine tools in Los Angeles or New Haven. "The day of the automatic factory has been brought closer by the robot machinist," according to Alois Stauber, managing partner of Daco.

Defense Possibilities—Ideal for mass production metalworking plants having long repetitive runs, the robot has wide possibilities in all types of defense production. Complicated machining operations no longer need depend on the skill of the operator.

Principal parts that make up this device are a paper-tape perforator and a sensor that translates the tape message into electrical impulses. These impulses in turn actuate selsyn motors which—like an operator's hands—tell the machine what to do.

Perforations in the tape represent essential dimensions shown on the blue print for the part to be machined. When the tape travels through the sensor, electrical contacts are made and broken through the holes, thus completing and breaking electrical circuits. This produces varying voltages in the sensor that accurately control movement of cutting tool and workpiece in the machine.

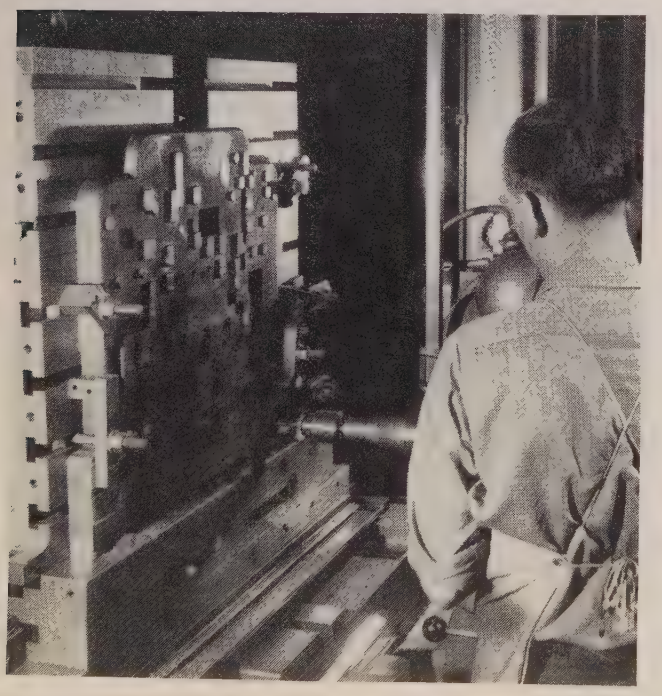
Unlike some other electronic "brains", machining accuracy is in no way influenced by this robot. If there are any deviations in dimensions of the machined parts, they will be the fault of the tool.

About the only manpower needed around the machine tool is for loading and unloading the work. As is usually done, dimensions will be checked periodically to see that parts are within tolerance limits, and to determine when dull or worn tools need to be sharpened, reset or replaced.

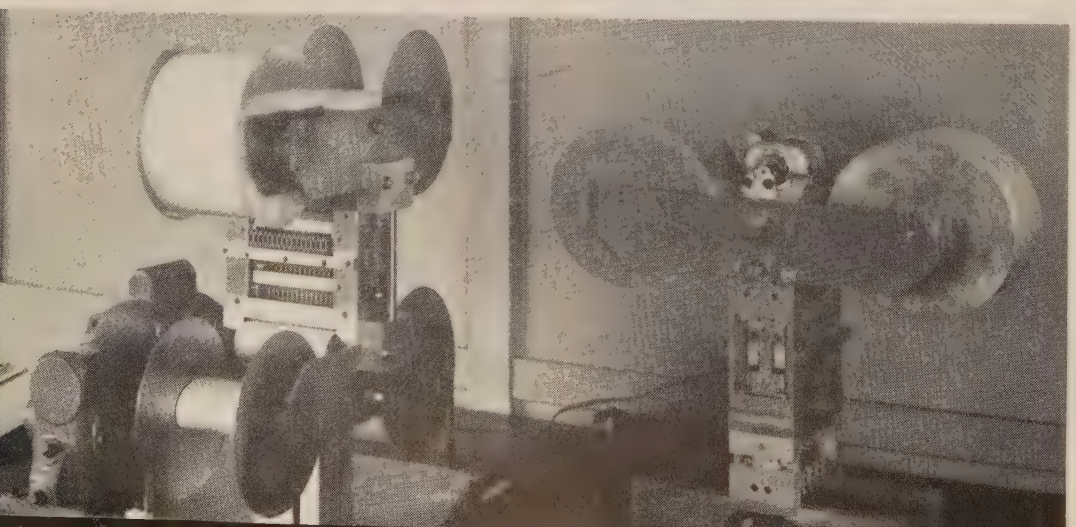
Flexible Robot—The robot is flexible because it is not wedded to the machine tool. Once a production run is completed on a given machine, the "brain" can be attached to another machine.

Brains of the Daco device are in the tape. This can be punched out by a draftsman who makes the required computations from a blueprint. In carrying out this operation, he places the part drawing over a grid-like graph paper. Holes in the tape represent points and surfaces on the part.

A plant operating these robots can keep a file of master tapes representing various arcs, flat surfaces and fillets. To set up a tape for machining a part, a series of master tapes in the right combinations can be fastened together.



Electrical signals from sensor mechanism govern tool location and operation of this jig mill. Attendant merely loads and unloads workpieces



Heart of "robot machinist" is this punching mechanism (left) which translates blueprint coordinates into tape perforations. Sensor (right) translates these perforations into electrical impulses which in turn actuate the machine tool in line with blueprint specifications

HIGH PRESSURE SETUP

Cleans Gear Housings

By HERBERT CHASE

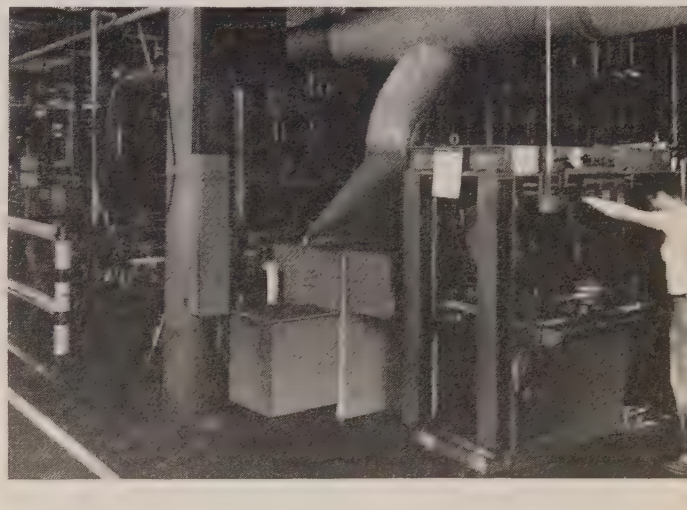
Conveyorized automatic washer, fed by one man, replaces old hand-brushing, low-pressure spray and blowing out arrangement requiring four men. Air hammers help loosen particles that might otherwise cling to interior surfaces

EXCELLENT results are being attained in a new setup for cleaning axle housings at the Lansing, Mich., plant of Oldsmobile Division, General Motors Corp. The new facility uses two less men per shift and at the same time is about 84 per cent more effective than the hand-cleaning methods that were formerly used.

Until recently, the arc welded and assembled axle housings were washed, brushed and blown out in a more or less conventional setup that required four men to operate. Despite considerable care, small slivers or chips of metal, scale or weld flux were not always removed. Sometimes this material was jarred loose in the constant pounding and vibration axles are subject to in service.

High Pressure Spray—To avoid these difficulties and, at the same time, to reduce the labor employed in cleaning, Oldsmobile designed and installed a completely new cleaning machine. An exceptionally high pressure spray is employed and means provided for moving the spray nozzles axially from both ends inside the axle. Every portion of the interior surface must be subjected to the impact of jets strong enough to loosen any particles that might, if not removed, come free in service. Air hammers are also applied to rattle the housings before washing so that mechanical vibration will jar loose adhering particles.

Porcelain-lined, three-stage John Bean pumps that spray cleaning solution heated to 100°F at 500 psi are provided. These pumps feed the same type of



After washing, housings are transferred into this spot welder where four clips are attached to support brake hose, leaving housing ready for assembly

Right—General view of Oldsmobile machine for high and low pressure cleaning of axle housings, as machine appears from the unloading end

Below—Loading end of washing machine. Axle housings are rattled with an air hammer to loosen any adhering particles of foreign matter before loading on washer conveyor

nozzles employed in "fog" fire fighting equipment, but in the cleaning machine nozzles discharge streams having the very high velocity needed to accomplish desired results.

To move the nozzles, one from each end of the housing parallel to its axis, nozzles are mounted at the ends of tubes that are advanced mechanically from the ends of the housing to its center. This is done while the axle is supported on transfer rails that come to rest after the axle housing is indexed into line with the spray tubes.

Spraying is done on the in-stroke with the housing set so its banjo opening is down. Thus, the cleaning solution drains into a tank from which it is again withdrawn, after settling, for recirculation by the pumps. Some solution also escapes through the end openings of the axle. Spraying is done in a tunnel that is water-tight but has doors for clean out purposes on top.

Hydraulic Advance—To insure proper registry of the housing with spray units, the transfer rails have notched ends; axle housings rest in these notches. Advance is by pusher that is hydraulically actuated a given distance at each indexing. Four air hammers are applied to each housing just before it reaches the first washing station to vibrate the housing and shake loose any such particles that can be thus displaced.

After loading on the cleaning machine rails, the housing is advanced to a position above the center of the first tank. It remains there while high pressure is applied automatically to the cleaning solution, which contains 5 pounds of No. 62 Solventol to 850 gallons of water at 100°F. Each nozzle is traversed in and then out again in succession, but pressure is turned off at the end of the out-stroke. Nozzles discharge 70 gpm. After this cleaning, the next indexing takes place. Outer ends of the reciprocated spray tubes are attached to flexible hose through which cleaning solution flows from the pumps, hence no sliding glands are needed.

Work Thoroughly Drained — After advance from the high pressure station, each housing stops at a drain station before being indexed to a low-pressure spray station. Spraying is done in the same way as before but at only 30 psi using a solution containing 30 pounds of No. 7X Solventol to 1025 gallons of water heated to 175°F. In this case, 400 gallons of the solution are discharged per minute. The solution not only cleans but produces a rust-resisting coating on the housing. This completes the cleaning but the housing stops to drain after subsequent indexings before leaving the tunnel. Solutions are checked for strength at each shift and are renewed weekly when the whole machine is cleaned out.

As housings leave the tunnel they transfer into a 35-kva Agnew spot welder having four heads in each of which a brake line clip has been placed. These heads then are moved in simultaneously to weld the clips to the outside of the axle making it ready to have gears, axle shafts and other units installed along an assembly conveyor line.

Guillotine Clears Wrecked Plant

DISMANTLING of an explosion wrecked plant in the Chicago area presented a tough problem because torches could not be used to remove bent and twisted ¾-inch reinforcing rods due to presence of inflammable fumes. A portable Guillotine hydraulic cutter made by Manco Mfg. Co., Bradley, Ill., proved ideal for the job. Ragnar-Benson Inc., contractor on the job, selected a hand actuated hydraulic pump supplying 45,000 pounds of thrust to power the unit although power operated pumps can be used. Each cut took an average of 8-10 seconds

Sample Mold Service Offered

Monsato Chemical Co.'s plastics division, Springfield, Mass., offers a sample mold service for foundries interested in trying out the resin-sand shell molding process. Service provides sample molds of Resinox phenolic resins and sand on patterns sent in to Monsanto. Foundries are enabled to carry on experimental casting operations using the shell molding process without investing in new equipment.

Detailed instructions have been prepared, including match plate dimension data, packing and shipping information and blueprints of investment box equipment. Company urges foundries to request these instructions before preparing patterns for samples. The sample shell mold is prepared from the submitted pattern and both are returned to the foundry for the actual casting operations.

New Photo Device Snaps Atoms

Radioactive materials, though hidden behind a thick concrete wall, can be photographed under a microscope by atomic scientists. Instrument is a joint development of American Optical Co.'s instrument division and General Electric Co. First of its kind, it is installed in the Knolls Atomic Power Laboratory, Schenectady, N. Y.

Operated by remote control, the instrument permits atomic researchers to work in complete safety. It consists of a special microscope for examining the structure of metals, camera, periscopes and an illuminating system in such an arrangement that light can get in and out through the thick walls of the test chamber. Nuclear radiations from the radioactive specimens, however, are completely blocked. At lowest power, specimen is shown in actual size. Magnification at highest power is 1000 X.

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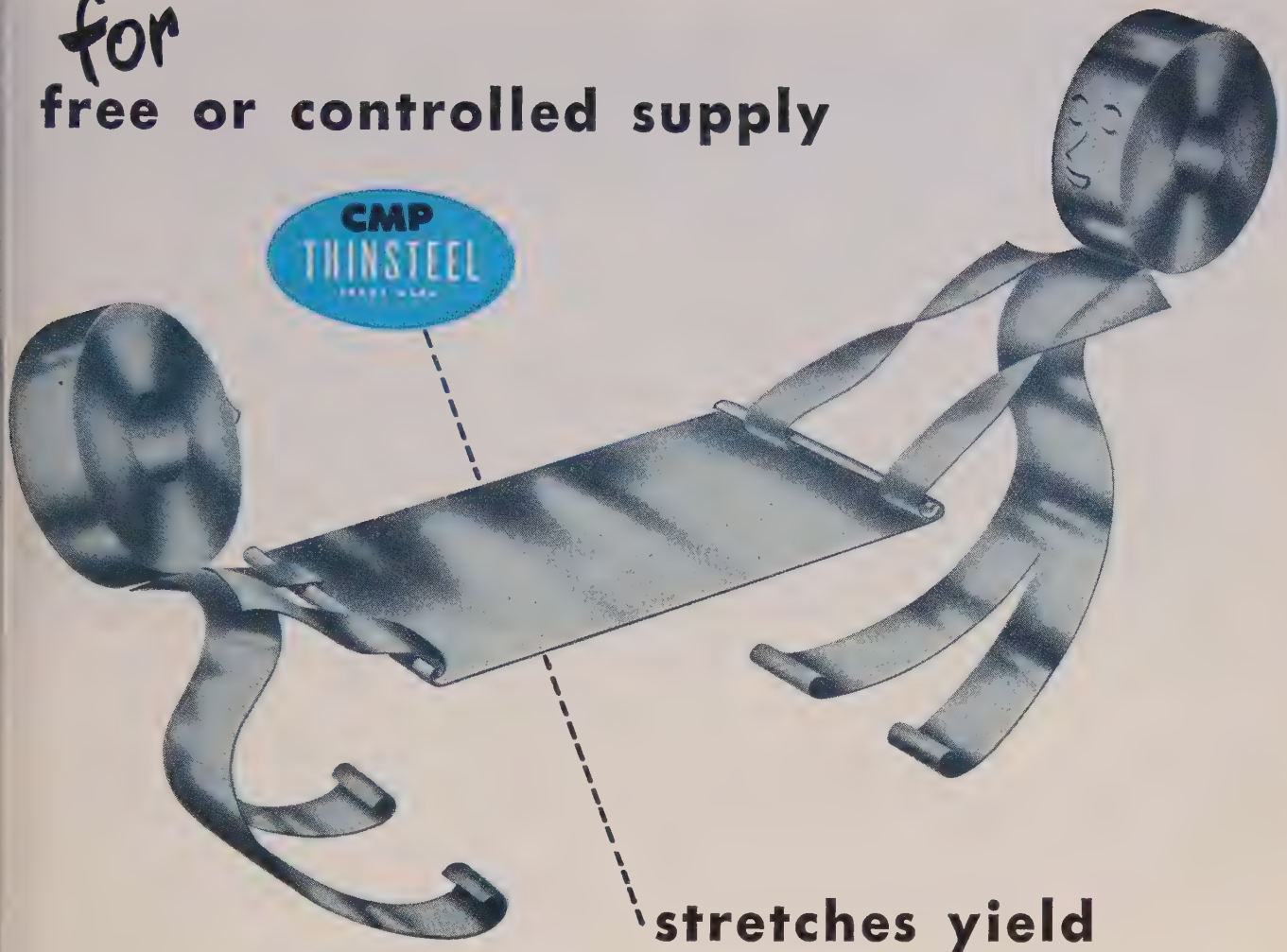

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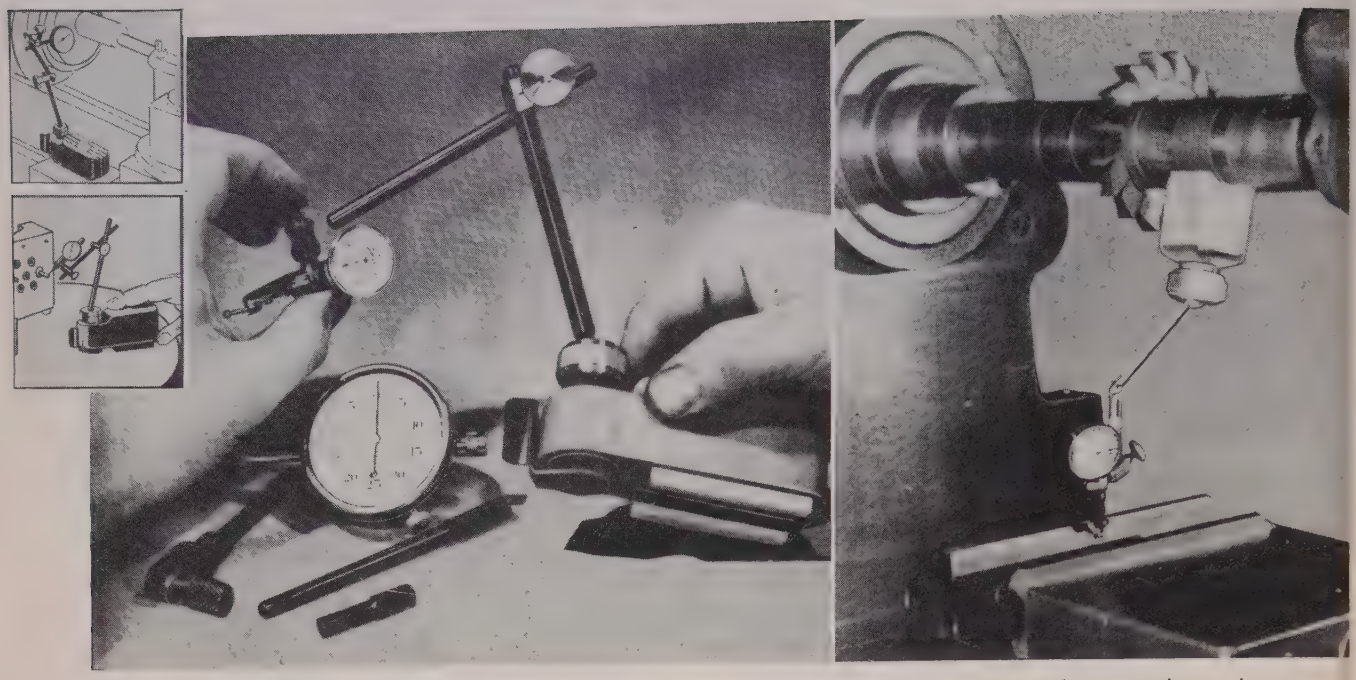


Portable magnetic indicator holder can be attached to any flat or rounded metal surface as shown here

Nonprecision Machine Tools Adapted to Close-Tolerance Work

By JOHN A. HOWLAND

DEMAND for greater time-saving and increased production in all types of machine shops, whether directly engaged in defense production or not, continues to develop and improve many pieces of machinery and equipment. Even a moderate saving on time and/or materials is a matter of first importance. One of the achievements in this direction is a portable magnetic indicator holder.

Magnetic base for attaching it to any flat or rounded metal surface is an important feature of the holder. The unit is made in two sizes, 50 and 100-pound magnetic pull. Development of this device was done by Enco Organization, Chicago.

No Precision Equipment—Normally, close tolerance machined units are made on precision turning equipment. However, there is necessarily very little precision turning equipment in the average machine shop. Usually such equipment is found in shops of large manufacturers doing high production machine work. One such job was for a large machine manufacturer; the company had an immediate short requirement of 100 pieces. Therefore, it would not have paid to set up the precision equipment to run to the 100 pieces and in addition, there was pressure to get the job done.

In this case, a small machine shop ran the piece on an ordinary engine lathe by holding it between centers, taking all longitudinal and horizontal travels of the machine and gaging them with the use of 1/10,000th indicators which were held in position by the magnetic pull of the holder. These holders were mounted to give a direct dial indicator reading both for the carriage travel and cross travel and in this manner both diameter and overall length could be accurately held.

Another handicap of this job was that the piece was poorly designed itself. The piece part, because of overlapping tolerances, actually did not allow the initial tolerance the designers had intended. This was so because the job was made in two sections which had to be identical and each one of these sections had the same tolerance of half a thousandth which in turn was the total tolerance on the entire job. In other words, when the two were placed together, they had to give a complete run out of only half a thousandth of an inch. Using the magnetic base indicator holder this job was run with only one half of 1 per cent scrap in the whole run and even that scrap was purely the operator's error.

Job Shops and Defense: Much of the high precision

government work will eventually be handled on specialized machinery which may take anywhere from six, to eight months to a year to acquire. In the meantime, most of the companies doing defense work are having pilot runs or prototype runs made. This work in most instances is being jobbed to shops throughout the country and it is very critical work. Backbone of the whole program are the small jobbing shops which make the models or pilot runs. With the magnetic tool, it is possible to duplicate any of this precision turning equipment that will eventually run this highly specialized work.

Test indicators can be secured even in jeweled movements and as such they can enable an operator on an engine lathe to do the work of the finest Swiss machinery. A little ingenuity and a little care on the operator's part enables him to check immediately all his travel readings to his large dial indicators.

Milling Operations—In toolroom milling, there is a lot of work that doesn't require the preciseness of a jigborer. On the other hand, it is beyond the scope of a vertical mill.

Here's an example of how the magnetic indicator can be used in milling operations. A magnet is placed conveniently on the table travel; and then through the use of jo-blocks, table travels are successfully measured to whatever desired accuracy the particular job needed. This is done by placing the jo-blocks between the indicator itself and a positive clamp block, measuring the jo-block first and taking an indicator reading and then transferring this indicator reading to the positive clamp block.

After moving the table to this given work position, the job is bored and finished like a progressive die where each succeeding position must be held accurately within from three to five ten thousandths of an inch.

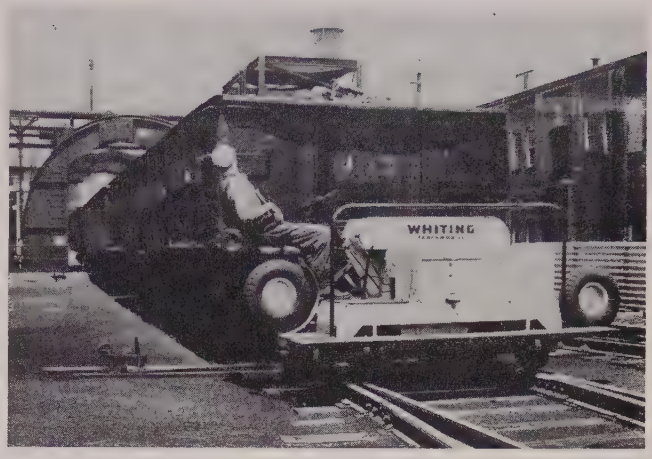
Another example of a job done on a mill, was milling a gear to replace a broken gear from a very old lathe. The gear was so odd that when the operator first tried to put it into a dividing head on a mill and space it out to cut the gear teeth, it was impossible to find the proper index plate to permit the use of the dividing head. But instead of that, the magnetic indicator holder with an indicator mounted was set up to give a reading on each succeeding tooth as it was brought around. An accurate gear was made.

Placed on Cutting Arbor — Still another machine shop job consisted of placing the magnetic holder on the cutting arbor itself and squaring the vise up so that the vice was traveling in a parallel plane, in other words, 180 degrees to the line of cut. This was set up in about 30 seconds.

In addition, and this may be even more important then the factor of time, expensive indicators which are hard to obtain, are very easily dropped with the old method of clamping the indicator.

Here is another example of how the holder has been used to save time. Dormeyer Co., makers of food mixers, runs all its motor armature testing between centers. They used to have as high as 25 per cent motor rejects using their previous methods of inspection. To eliminate this, they take the magnetic holder and put a small indicator on it and use the longest stem that comes with the set as a lever.

Mobile Unit Shifts Freight Cars



AUGMENTING the switching railroad used to handle cars over the 48 miles of railroad track in its Whiting, Ind., refinery, Standard Oil Co. (Indiana) uses the Trackmobile made by Whiting Corp., Harvey, Ill., for a variety of jobs like emergency moving of cars onto the coal dumper. Since the unit can be driven on track or on the ground, considerable time is saved when unscheduled operations would mean a delay in calling for a switching engine

They then insert the armature between centers and bring the indicator down and take a reading. Then they check the concentricity of the armature. Using the hinge movement of the holder after the armature has been checked, they withdraw the particular armature and insert another one. By using this method, they have practically eliminated motor rejects. Difficulties are caught at their inception.

Vanadium Alloys Opens New Lab

Laboratory operations of Vanadium-Alloys Steel Co. are now concentrated in a new building more than twice as large as the previous laboratory. Of functional design, the building is attractively constructed, has vitreous tile walls and terrazzo floor. A powerful ventilating system for removal of fumes adds to the safety and comfort of workers.

Feature of the new laboratory is the direct reading spectrometer, an electronic spectroscope which determines analysis of steel by measuring light waves emitted by various chemical elements. An accurate quantitative analysis of eight elements can be obtained in 1½ minutes.

Improved Flux Cuts Weld Cost

Improved types of Solar flux aimed at cutting costs and improving quality in fusion welding of corrosion and heat-resistant metals are available from Solar Aircraft Co., San Diego, Calif. Company research has developed four types of back-up flux used to weld stainless steel and other high nickel and cobalt alloys. In one case reported by the company, use of Solar flux in the welding of high strength, low alloy steel aircraft parts cut rejects 95 per cent, cut materials handling by two-thirds and boosted efficiency of welding operators 10 per cent.

This is the first of a series of articles which will be presented in STEEL during the coming months. The treatise will deal with such phases as the hearth and bosh, coke ash and thermal effects, generation and recovery of heat, fluxes, beneficiation of raw materials including iron ore, properties of coke, beneficiation of air, enrichment of blast, and other details. The accompanying article discusses the efficient control of thermal economy

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

Blast Furnace Practice...

I—Operating Theories

HEAT is the agent which affects all chemical reactions in blast furnace operation. Consequently, control exercised in conservation and application of it in effecting the reactions is a major item in control of pig iron production cost. In recent years cost of furnace coke, the source of heat, has increased at a more rapid rate than cost of iron ore. Since there is certainty of increased cost for both because of necessity for beneficiating low-grade ores and coal to replace the rapidly diminishing supply of high-grade materials, importance of heat conservation and efficient application of it to the work it must do, makes intensive study of distinction between thermal requirements and effects imperative for every blast furnace management and operator.

Because blast furnace operation is a complex relation between chemical, thermal, mechanical, and commercial principles (each variable in effect upon operating economy) direction of the operation must be considered in two divisions:

1. Direction which determines economy of operation over a long period of time based upon studied policy of operating and commercial principles.

2. Direction needed to meet daily and/or hourly fluctuations in operating conditions which occur based upon operating principles alone.

Division (1) is primarily the function of management, and the degree of success with which it is directed will determine the degree which is possible in division (2), primarily the function of furnace supervision. Because depletion of high-grade blast furnace raw material reserves in the United States affects national economy and security as well as private interests clear understanding of furnace operating principles is of greater importance now than it ever has been, and it would be difficult to overstress that importance.

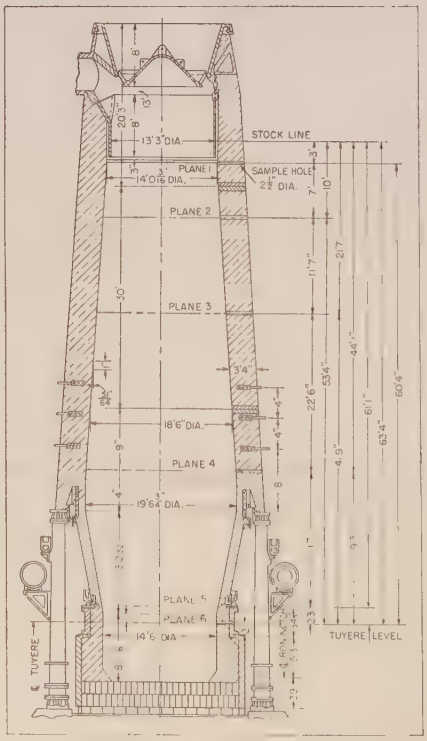


Fig. 1—Section of blast furnace representing Southern practice

Terms Are Clarified—Distinction between thermal requirements and effects in furnace operation may be described by saying requirements are the minimum volumes of heat necessary to effect the respective chemical reactions under ideal conditions, and effects are the actual conditions under which the reactions are completed. Although complete and exact knowledge of all chemical reactions within the blast furnace have not been determined, enough of them have been disclosed by qualified research authorities to permit conception of operating theories. These can be accepted with assurance of reasonable accuracy because of the manner in which they can be sustained with practice data from actual operation.

Operating theories presented in this treatise are based upon Johnson's two-thermal equation theory[1]; quantitative measurements of chemical and thermal reactions in actual furnace operations by United States Bureau of Mines[2]; and research of McCaffery[3] and co-workers into mineral composition of blast furnace slag. The teachings of these three authorities as a premise is briefly this:

1. The principle involved in the

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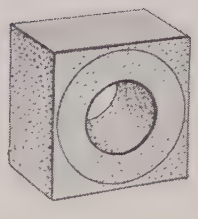

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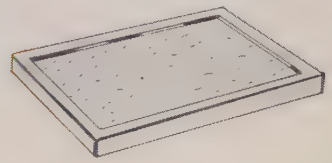

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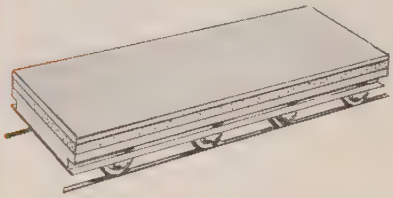
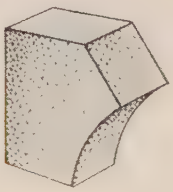


TUNNEL KILN CAR TOPS
Ordinary fireclay crumbled after few trips. Kaocast lasted 30 trips without deterioration.



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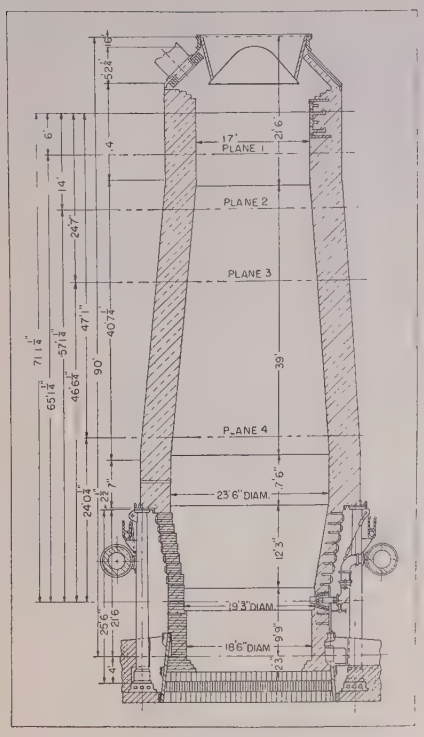


Fig. 2—Section of No. 4 stack, United States Steel Co., South Works, S. Chicago, Ill., representing northern practice

two-thermal equation theory is the preparation of raw materials in the furnace shaft for later smelting in the bosh and hearth. Preparation is effected at temperatures *below* fusion temperatures of the raw material solids; smelting is effected at temperatures *above* the fusion temperatures of raw material solids.

2. Volume of heat is measured in thermal units, Btu. Temperature is measurement of thermal unit concentration.

3. In blast furnace operation the respective chemical reactions will occur at the respective temperatures required by thermochemical laws; with reaction a fixed volume of heat per pound of chemical constituent will be either consumed or evolved.

Heat Distribution Important — Based on the foregoing premise it seems clear that efficient control of thermal economy in blast furnace operation lies in proper distribution of heat, in both volume and degree of concentration, to the respective zones in the furnace where the respective divisions of work occur. Illustration of the problem, in the initial step of raw material preparation for smelting, may be given with comparison of thermal requirements and effects for different iron bearing materials.

Figs. 1 and 2* show cross sections of furnaces where the Bureau of Mines scientists measured chemical and thermal reactions in actual operation, with planes marked 1 to 6 indicating the approximate zones in the furnace where various reactions occur. For comparison of thermal effects and requirements representative volatile matter content of three iron bearing materials will be used:

	Surface & absorbed moisture, %	Combined volatile matter, %
Southern self-fluxing ore ..	3.00 (H_2O)	12.00 (CO_2)
Mesabi ore	12.00	3.00
Sinter	0.00	0.00

To clarify reasoning total percentage of volatile matter in Southern and Mesabi ores is shown to be equal, with respective percentages of surface and combined volatiles reversed. Sintered ore is shown free from both.

Sequence of Top Reaction—Because of low concentration of heat required (212°F minimum) surface and absorbed moisture of raw materials charged into the furnace must be the first volatile constituents to be evolved at the top of the furnace shaft, chemically combined volatile matter follows, and absorption of heat for fusion cannot occur until all combined volatile matter has been evolved. Percentage of content and chemical composition of volatile matter contained in stock is the factor which determines ratio of heat consumption by volatile and nonvolatile matter in the shaft operation. Consequently it is the important factor in determining the permissible blowing rate and volume of heat which may be delivered safely to the shaft.

Surface and absorbed moisture contained in raw materials charged into the furnace is first converted to water vapor and then superheated to the temperature of top gas leaving the furnace. Temperature of top gas will be determined by the degree of concentration which is possible with the volume of heat available from the total volume delivered to the shaft from the bosh—after the volatile constituents have consumed the portion required for their volatilization. For representative normal furnace operation this temperature will be about 350°F. It is general practice in soft ore operations to add water to stock to hold top temperature to approximate the degree indicated. With this temperature mathematical calculation indicates about 1170 Btu will be consumed per pound of moisture (H_2O) for evolving surface and absorbed moisture from stock and/or water added with stock. For evolving the combined volatile matter indicated (CO_2) 1850 Btu per pound of CO_2 will be required.

Presents Three Variables—Because of these per pound differences in heat requirements for volatile constituents having different chemical compositions it is obvious that the volume of heat required, the zone in the furnace where it will be consumed, and the rate at which it may safely be delivered to the respective zones, will vary with percentage of content and chemical composition of volatile matter contained in raw materials used.

Carbon dioxide (CO_2) content in gas taken from plane No. 2 (Figs. 1 and 2) by Bureau of Mines research indicate fluxing stone had been calcined below plane No. 2 in both the Southern and Northern furnace operations, which makes it certain that all surface moisture

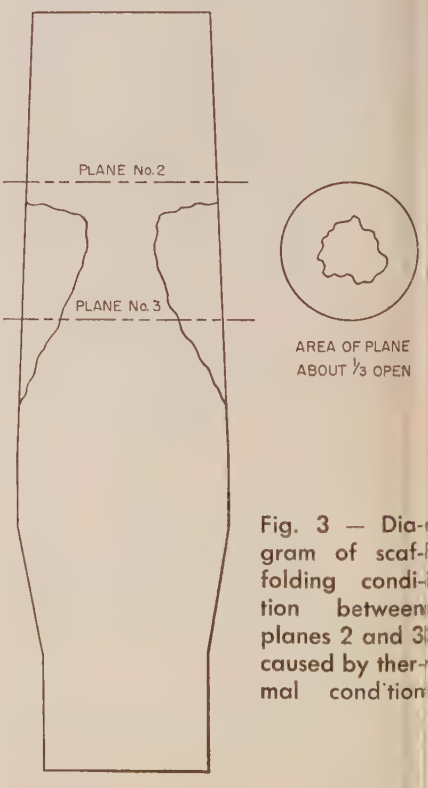
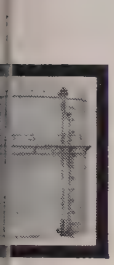
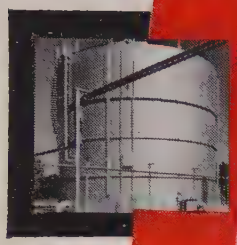
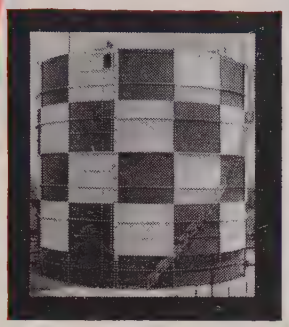


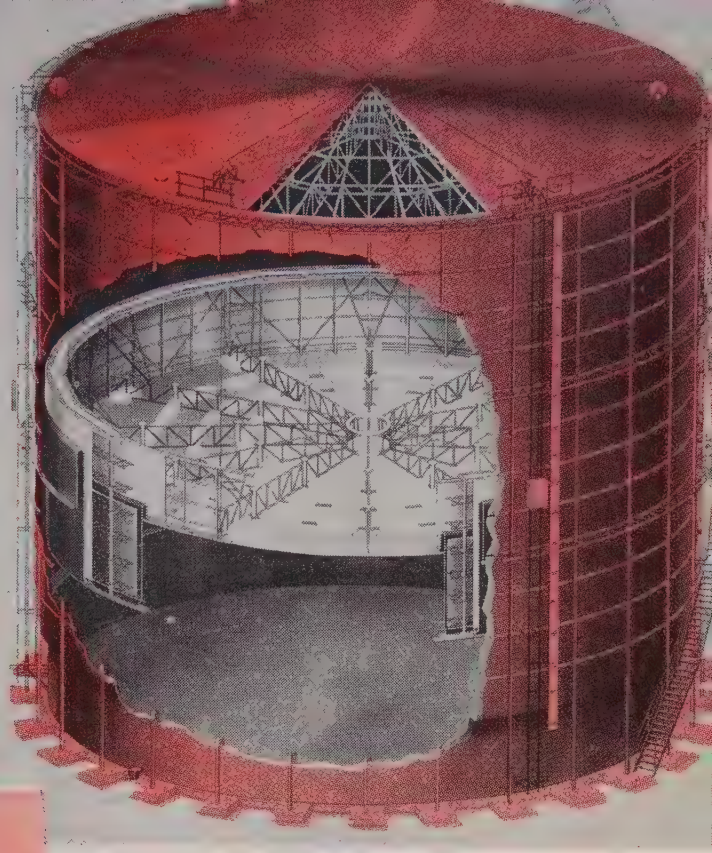
Fig. 3 — Diagram of scaffolding condition between planes 2 and 3 caused by thermal condition

*From Technical Papers Nos. 391 and 442, Bureau of Mines, Washington.









safe, simple, 50 built in three years

See American Gas Association Builder's Committee Report (May, 1951)

As gasholders go, the Wiggins has a remarkably simple design. It has none of the complicated mechanisms of old-type gasholders. No materials that can be harmed by weather. Wiggins is the ONLY gasholder that uses no water, no tar, no grease. Wiggins assures no weather worries, no operating costs, no maintenance problems. It's the only gasholder with an absolutely dry, frictionless seal.

Designed by the famous conservation authority, John Wiggins. Built and erected by General American.

The frictionless piston rises and falls with changes in the gas volume. The gas tightness and impermeability of the Wiggins dry seal has been proved in actual operation.

Can be built to any capacity. Old gasholders can be converted and capacity increased as much as 50%.

write for new bulletin WG22

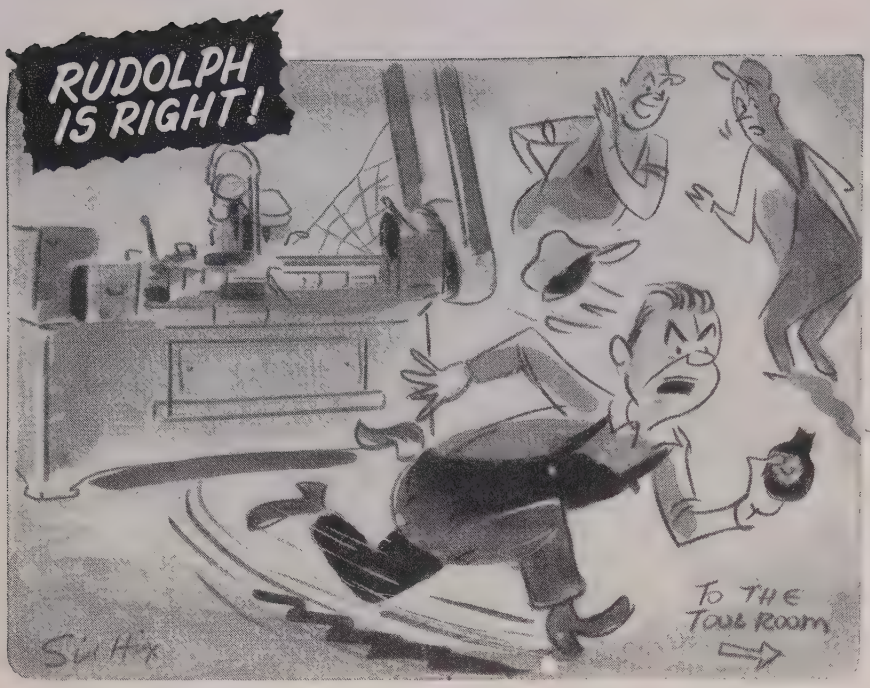
Wiggins Gasholder

for industrial and chemical process gases

WIGGINS VAPOR SEALS GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN
TRANSPORTATION CORPORATION
135 South LaSalle Street, Chicago 90, Illinois

Offices: Buffalo • Cleveland • Dallas • Houston • Los Angeles • New Orleans • New York • Pittsburgh • San Francisco • Seattle • St. Louis • Washington ★ **Export Dept.:** 10 East 49th Street, New York 17, New York ★ **Plants:** Birmingham, Ala. • East Chicago, Ind. • Sharon, Pa.



"Using the Right Cutting Fluid Would Eliminate a Lot of Time and Money Wasted Changing Cutters"

There are literally thousands of examples to prove how the right application of the *right* cutting fluid can make a tremendous difference in machining efficiency. Here is another one which will help you realize the opportunities afforded by an open-minded look at your cutting fluids:

● **THE JOB:** Generator machining a 1" dia. worm gear, double thread.

COMPARISON OF CUTTING FLUID PERFORMANCE

	Previous Oil	Stuart's THREDKUT
Production per grind/dress	20 pieces average	190 pieces average
Finish	Passable	Satisfactory
Oil dilution	None	4 to 1
Cost of oil on machine	42c/gal.	27.2c/gal.
Downtime during test	2½ hours	None

Think of the increase in cutter life (cost about $86.90 each). Before using Stuart's ThredKut they were reground 9½ times as often. Add to this the saving in downtime and the saving in cutting fluid price and you'll see why "Rudolph is Right."

Write for your copy of Stuart's Shop Notebook — a bi-monthly publication devoted to the selection and application of metal-working lubricants.

GET MORE PRODUCTION
Use The Right Cutting Fluid

STUART SERVICE
Goes with every Barrel
Offices in Principal Industrial Centers

D.A. Stuart Oil Co.
2735-37 S. Troy St., Chicago 23, Ill.

had been evolved above plane No. 2. With the indicated volatile matter content of the Southern and Mesabi ores greater volume of heat per pound of ore would be required for evolving volatile matter from Southern ore than would be required for Mesabi ore, even though total percentage of content is the same in both. Also, with the Southern ore greater percentage of total heat consumed would be consumed below plane No. 2 than would be consumed above it, and with Mesabi ore greater consumption would occur above plane No. 2 than below it. Since the blowing rate largely determines the volume of heat delivered to the shaft it follows that Southern ore would require, or permit, a faster blowing rate than Mesabi ore, and it is common operating knowledge that in actual practice Southern furnace operations do blow at faster rates than Northern furnaces which use Mesabi ores.

It follows, if either Southern or Northern ores are sintered and all volatile matter is evolved from them before they are charged into the furnace there would be reduction in thermal requirements for shaft operation, and, if the same blowing rate was maintained with sintered ore, as had been used with natural volatile bearing ore, there would be excess heat delivered to the shaft which could cause fusion there.

Creates Critical Condition — For illustrating the principle involved 100 per cent changes in volatile matter content percentages have been used, but obviously, in any furnace operation, substitution of fractional percentages of volatile free material for volatile bearing material will exert proportional influence for creating the thermal effect indicated. It seems reasonable to say that for every furnace burden there is a critical condition in the shaft operation, created by relation between volume of heat delivery and volume consumption which must be maintained in equilibrium. Any fractional reduction in heat consumption from substitution of volatile free material for volatile bearing material will create, or permit, proportional concentration of heat. With sufficient concentration of heat opportunity for fusion is created and with fu-

sion in the shaft there is virtual certainty of formation of scaffolds on the inwall of the furnace—because the fused material does not have fluidity.

Fig. 3 illustrates graphically the scaffolding condition caused by the thermal effect described. Because such conditions are most undesirable they are rarely, if ever, publicized by the operators concerned but specific instances could be cited where the condition illustrated has occurred in actual furnace operations in the Southern, Northern, and Eastern districts, with various word of mouth explanations having been given for their cause, from bad furnace lines to poor quality of sinter, but in the light of Bureau of Mines research data it seems reasonable to say that in every instance the true cause was attempt to maintain a volatile bearing ore blowing rate after substitution of some nonvolatile bearing sinter for volatile bearing ore. After the percentage of nonvolatile bearing material used in a burden passes the critical percentage which permits concentration of enough heat to cause fusion in the shaft, formation of scaffolds is inevitable—unless complementary adjustment in volume of heat delivery is also made.

Ill effect of high top gas temperature on furnace top equipment due to excess heat above plane No. 2 can always be safe guarded with addition of surface moisture (water) to stock but that expedient does not benefit the operation below plane No. 2 and excess heat there will cause fusion in the zone between planes Nos. 2 and 3.

(To be continued)

BIBLIOGRAPHY

[1] "Principles, Products and Operation of the Blast Furnace (1918) by J. E. Johnson, Jr.

[2] Technical Papers Nos. 391, 397, 425 and 442, U. S. Bureau of Mines, Washington.

[3] Year Book (1931) A.I.M.E. Richard McCaffery and Co-workers.

Induction Heating Outlined

Induction heating equipment is described in a 12-page two-color bulletin published by General Electric Co., Schenectady 5, N.Y. Illustrated booklet outlines forging, hardening, brazing, and annealing applications at 1000, 3000, and 10,000 cycles. It lists components and requirements of induction heating with motor-generator equipment, covering such applications as forge welding, heating drill bits.

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Here's a chance to get the full story on Engineered Fire Protection. 36 colorfully illustrated pages tell all you need to know about fire safety, including the economies of protecting your business . . . complete data on installation, operation and maintenance of *"Automatic" Sprinkler* devices and systems . . . *valuable information for your files!!* Use the handy coupon below to order your free copy of "The A-B-C of Fire Protection."

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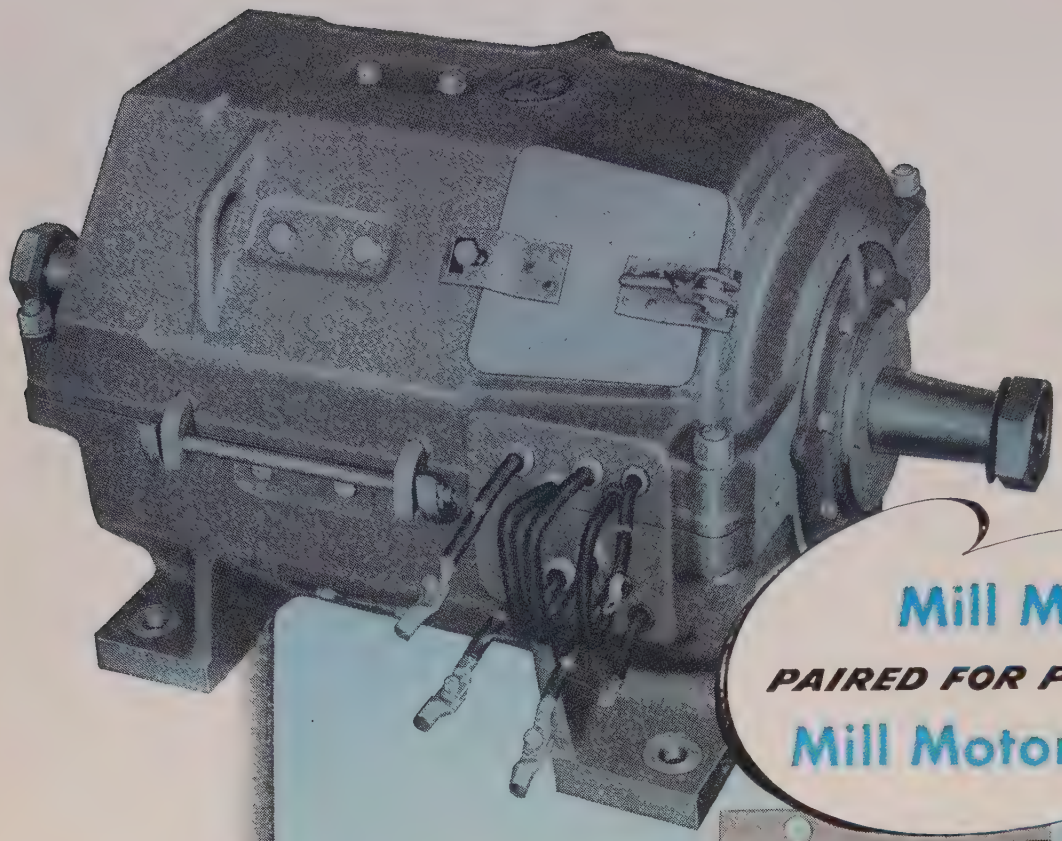
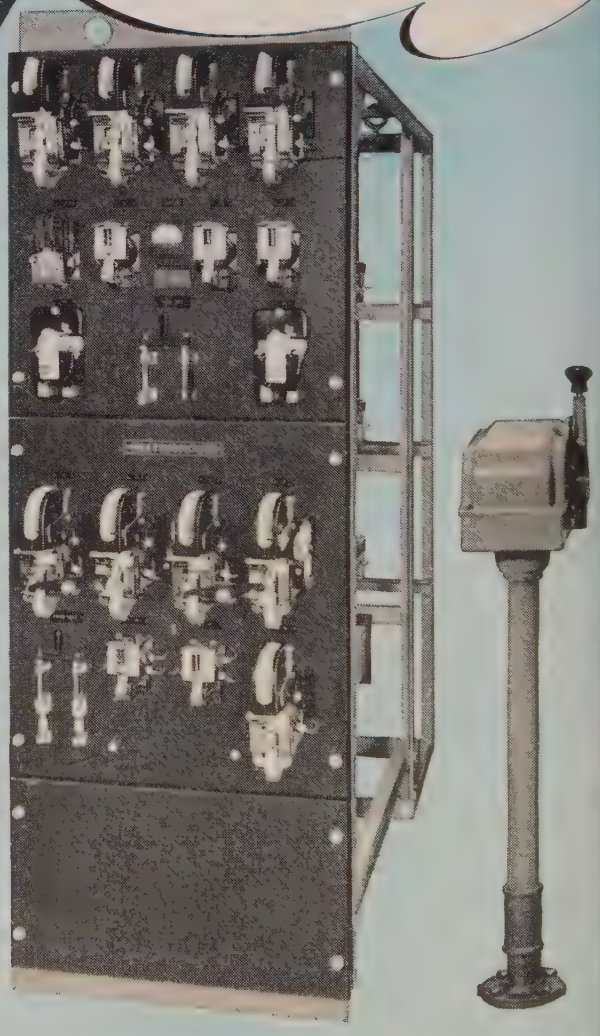


Mill Motor

PAIRED FOR PRODUCTION

Mill Motor Control

600 Series Mill Motor



Typical 9500
Line Controller, Type M
Contactors and Type SM
Master Switch

Rugged!

cut mill down time with this team

Certainly in a mill, where down time costs add up fast, the ability of equipment to stand up to rugged continuous duty is of paramount importance. That's why you'll find this combination hard to beat. They are rugged . . . made together to work together. Each incorporates the latest design features to keep production lines rolling.

Take the motor for example. The high starting torque of this new 600 series mill motor is ideal for high inertia loads . . . proved commutation . . . high rated efficiency assures maximum performance under tough service conditions . . . simplified construction makes servicing and maintenance easy. It is a brand-new motor with a new kind of performance built for today's tougher jobs.

Controllers, too, are built to assure new dependability. Main contactors are the new Type M with knife-edge, trouble-free bearings . . . with exclusive Quick-Quench arc boxes which greatly increase contact life. Overload relays are the dual thermal instantaneous type. Accelerating relays are the time-proved inductive time delay Type AZ.

The third part of this control team is the rugged Type SM master switch. Easy to operate, yet with a definite "feel" for each operating point of position, the switches are available with 2 to 6 speed control.

Together, these three offer a new kind of dependability. Get the facts on all three. Ask your nearby Westinghouse representative for a copy of the new booklet B-4730, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21647

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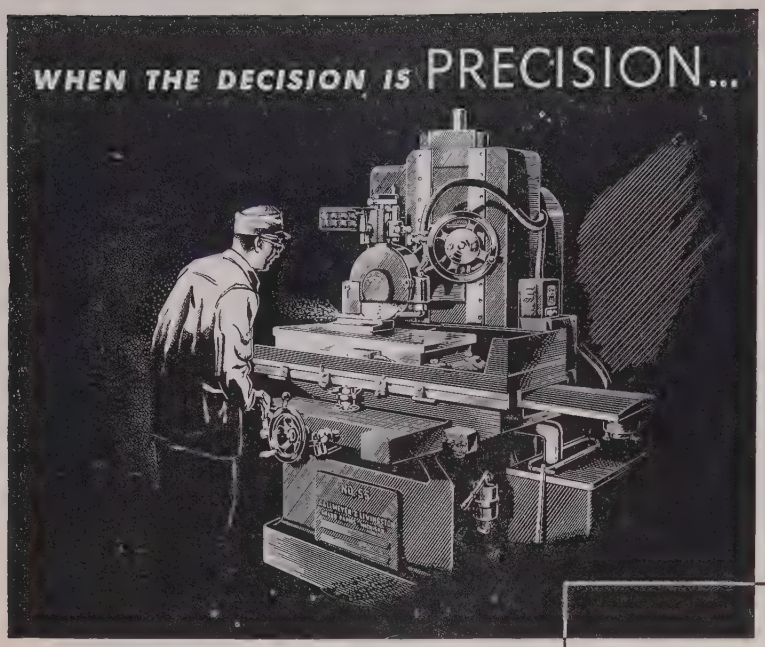
Westinghouse

MILL MOTORS AND CONTROL



Where extreme tolerances are not required, the choice of any particular grinding machine may not be too important. But, where absolute precision is demanded, the choice is usually *Grand Rapids.*

Defense orders make it impossible to fill orders as quickly as we desire—but we know our customers can appreciate the reasons for delay. As always we'll do our best to serve you.

GALLMEYER & LIVINGSTON CO.
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Grand Rapids Grinders
—World's finest

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THE ONLY PLANT IN EASTERN U. S.

EQUIPPED FOR **STEEL PICKLING**

COILS UP TO 48" WIDE

Prompt Quality Service

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- COIL SHEARING
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PICKLING coils:
1" to 48", 10 to 20 gauge
100 to 10,000 lbs.

SHEETS & PLATE: Any width, any length, any thickness.

CAPACITY: 25,000 tons/month.

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Subsidiary: **AMERICAN TOOL & SUPPLY CO.**

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Asks Defense Standards Revision

Development and adoption of common industrial standards would benefit both the military and industry in meeting defense production requirements, says Richard C. Sogge, manager of General Electric Co.'s standards division. Speaking at a meeting of the American Ordnance Association and the American Standards Association in New York, Mr. Sogge urged adoption of common standards that would permit the electrical industry to handle defense production more efficiently. Standards used in defense production for a "strictly military purpose" were, of necessity, different than those used in production of commercial goods, but many defense items could follow industrial standards.

"When standards are different than those in industry, it takes considerable time to make adjustments and it costs money. We must avoid as much of this as possible by closer co-operation and understanding during peacetime.

He points out that defense production would benefit from co-operatively developed standards for screw threads, bolts and nuts, cylindrical fits, ball and sleeve bearings, welding apparatus, color codes for piping, color codes for machinery lubricants, electrical measuring instruments, capacitors, rectifiers and other components, drawings and drafting room practices.

Casting-Welding Data Published

As part of its continuing research and development program, Steel Founders' Society of America has just published a comprehensive new manual incorporating most advanced technical data on welding of steel castings. Based on exhaustive studies carried out by the society, member companies and professional research engineers, the 40-page report, "Recommended Practice for the Welding of Steel Castings", comprises a valuable guide for steel foundries and related industries to use in establishing reliable welding procedures and experience-proven quality standards.

Recognizing that welding on occasion becomes an integral operation in the manufacture of steel castings, the manual likewise recognizes that industry also is actively engaged in cast-weld construction techniques (welding steel castings together to form an integral unit), and in fabrication of engineering structures through the welding of steel castings and wrought steel products (composite fabrication). Procedures outlined in the manual thus are equally adapt-

able to the needs and problems of the fabricator as well as the foundry.

Copies of the manual may be obtained by writing to F. Kermit Donaldson, executive vice president, Steel Founders' Society of America, 920 Midland Bldg., Cleveland 15. The price is 35 cents per copy.

Inventory Control System

(*Concluded from Page* 93)

the part of the operators. The thorough and intensive training program instituted last year for newcomers has worked out well in lieu of actual shop experience. A continuing campaign of education in the costliness of modern precision tools has helped, too, in reducing losses through damage in use.

Personal tools, general-purpose hand tools such as hammers, scales and pliers, belonging to the individual employee on the job, represent another 100,000 items properly to be considered as part of the grand aggregate of tools in daily use. These personal tools, made up in standard kits for each classification of worker, are purchased from the company at wholesale prices. Uniformity in the size, selection and quality of the tools is promoted in this way.

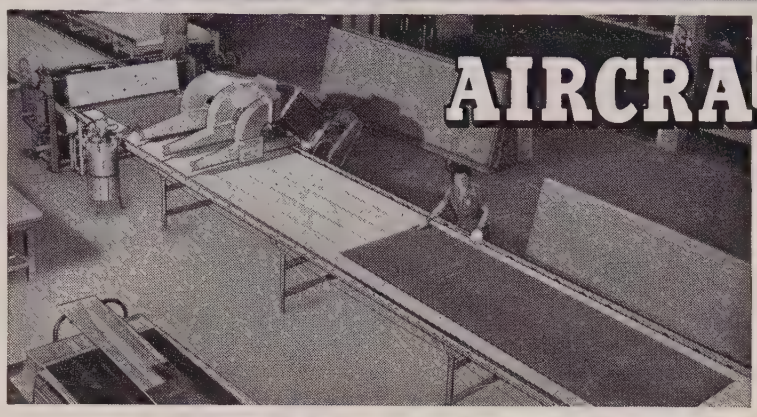
About that hypodermic needle—needles are used, among other things, for injecting a fluid to fill the minute air bubbles which sometimes appear in pilot canopies, astradomes and other such plastic moldings.

Ceramic Coatings Plant Opens

Bettinger Corp., Waltham, Mass., announces opening of a plant devoted exclusively to high temperature ceramic coatings, six weeks after the Air Force called for immediate coating of certain airplane component parts to ease the supply situation on scarce metal alloys. First order to come out of the new plant is ceramic-coated turbo-supercharger component parts used in the B-36, C-97 Stratofreighter, B-50 bomber and B-29 bomber.

High temperature ceramic coating was developed by William Harrison of the U. S. Bureau of Standards, to help conserve supplies of the scarce, heat-resistant metal alloys used in aircraft component and engine parts. A ceramic coating less than 0.001-inch thick enables these parts to resist the abnormally high temperatures (up to 2000° F) and corrosive fumes generated by the intense heat of the new engines.

Results of this first full scale production indicate potential industrial applications for commercial aircraft parts, combustion chambers, exhaust



Production increased — handling costs cut — in these and many other industries with Standard Conveyors.

The installations shown above are representative of the range and versatility of Standard Conveyors. An experience record of more than 45 years, serving all classes of industry and business, qualifies Standard to be of service on any conveyor need — roller, belt, slat, chain, wheel, push-bar, sectional, portable, self-contained conveyor units — pneumatic tube systems. Write —

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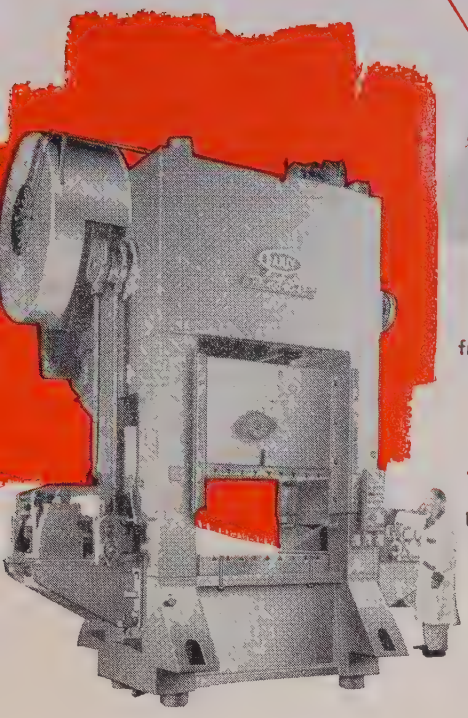
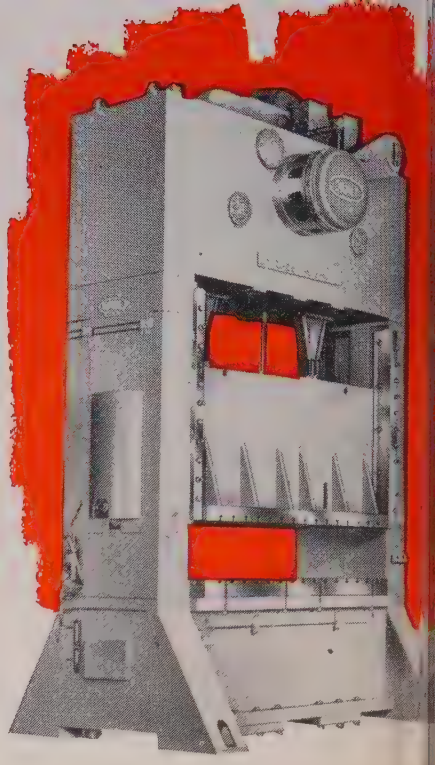
...to increase output!



Danly Autofeed Presses feature greater frame rigidity for each rated capacity, reducing vibration and deflection at higher operating speeds. Production of stampings is increased, dies last longer.

Actual production figures* show where Autofeed presses are tripling production using the same dies formerly used on conventional presses of the same tonnage. Likewise, in some instances dies are lasting three times as long between regrinds on Autofeed presses.



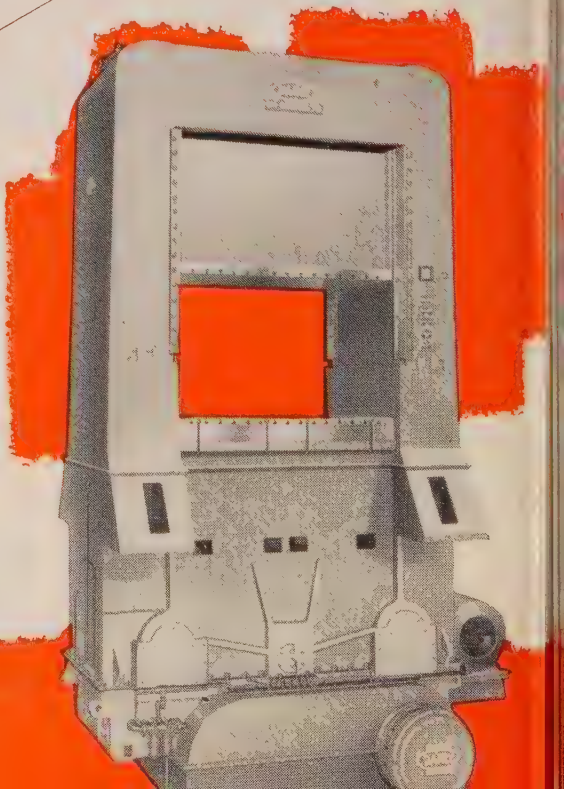
Industry's Leaders

DANLY

...to facilitate material handling!

Danly Underdrive Presses, single, double and triple action, are built to clear the working floor for the main function of production. Access required for either major maintenance or service is provided for on a separate subfloor beneath the main working floor.

Many of these presses are being installed in some of this country's most modern stamping plants.* Today, modern trends in automatic material handling are being proved through the dependability of Danly Underdrive Press operation.



*Specific information available on request.

...to save manhours!

Danly Single Action Straight Side Presses like this, with automatic lubrication and the exlcusive Danly Cool Running Clutch, are setting new industrial standards for press dependability.

In one leading farm equipment plant* careful shop records indicated average maintenance requirements of only two and one-half hours per week for a 12-month period—and most of that time was consumed in routine press attention!

Danly Double Action Presses are well suited to head up lines producing deep drawn stampings. Features like Danly's Cool Running Clutch offer added dependability so vital in production line operation. In a large automotive plant* a Danly 500-ton press, single stroking 300 times an hour day and night, has not even required clutch adjustment for lining wear after six months.

...to reduce costs!

Choose DANLY PRESSES

You find Danly Presses in the plants that set America's production pace because they're designed and built to increase output and reduce costs at the same time. Unique operating features like the Danly Cool Running Clutch together with extra rigid precision construction and automatic lubrication permit longer uninterrupted production runs—save costly down time.

Write today for detailed literature on any of the Danly Press types shown here—or call a Danly press engineer for discussion of your specific stamping problem.

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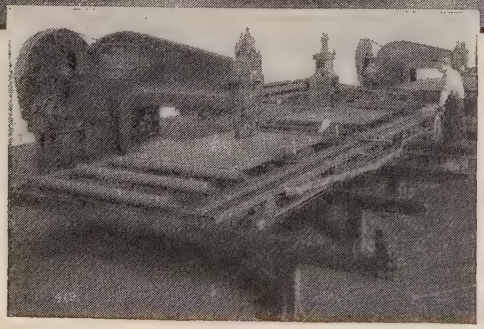
No Layout needed!



. . for punching, slotting and notching of plates

One-man Operation; Positive Control; Quick, Accurate Positioning

Where runs are too short to justify the use of a spacing table, or where irregular plates must be handled, this modern Thomas Duplicator is ideally adapted. It affords rapid, precision duplication of holes, notches or slots, and will speed production in car-shops, bus and truck building plants and in numerous other fabricating operations in varied industries.

Write for Bulletin 312

PUNCHES • SHEARS • PRESSES
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1A

pipes, manifolds and other automotive parts, furnaces, chemical equipment, and other industrial equipment where corrosion or abrasion is a factor.

Field Service for Transformers

Electrical Service Division, Wagner Electric Corp., St. Louis, services customers' transformers on the job with a mobile unit recently placed in operation. The truck is equipped to handle all types of power transformers, including assembly of new transformers shipped partially disassembled.

For installation or removal of bushings, radiators, conservators and other auxiliary equipment, the truck is equipped with a 6000-pound power driven cab-controlled winch and a 30-foot telescoping steel gin pole. A Wagner rotary compressor furnishes compressed air for the truck's brakes and for pressure testing of transformers. It is also used as a vacuum pump for removing air bubbles from transformer liquid.

The truck carries its own welding generator, and a 60 cycle, 110/120 volt, single phase generator which allows the unit to operate independent of any outside power source.

Silver Brazing Problem Solved

American Platinum Works has compiled a 48-page pocket-size manual entitled, "Complete Guide to Successful Silver Brazing." It provides answers to general questions on low temperature brazing, brazing alloys, joint design, preformed brazing shapes, plymetals, fluxing, heating methods, cleaning and inspection.

More than 50 drawings and charts illustrate the text. Among them are charts providing at-a-glance specifications for silver brazing alloys, U.S. government specifications, conversion data, brazing alloy quantities by weight. Booklet also contains a graph to calculate the thermal expansion of metals and various silver brazing temperatures. Copies may be obtained from the company, 231 New Jersey Railroad Ave., Newark, N. J.

Keeps Eye on Temperature

Electronic scanning, developed by Minneapolis-Honeywell Regulator Co., keeps an automatic eye on 270 separate temperature points. System records only those temperatures which deviate beyond a preset limit and includes an audible alarm that permits immediate correction of excess temperatures. The system will have wide application in processes where temperature of feed material must be maintained at specific levels to avoid defects in the finished product.

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No more waiting! Roebling's expanded facilities can meet your needs right now!

PROMPT! FAST! . . . that's the sort of deliveries you can count on now for Roebling high carbon flat mechanical spring steel. For many years Roebling has had one of the largest specialty mills in the country and today's expanded facilities have boosted production to new highs.

Roebling flat spring steel is made as you want it . . . annealed, hard rolled untempered; scaleless tempered; tempered and polished, blue or strawed. And from open hearth to finished product, Roebling positive control assures uniform quality . . . saves preparation time for users . . . brings faster, smoother production.

Roebling is ready to furnish flat spring steel with the exact mechanical properties required for any special type of application. Write or wire now for full information. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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Continuous & Automatic End-to-End Straightening

...of round tubes and bars, 1/8" to 10" diameter, as short as 1"

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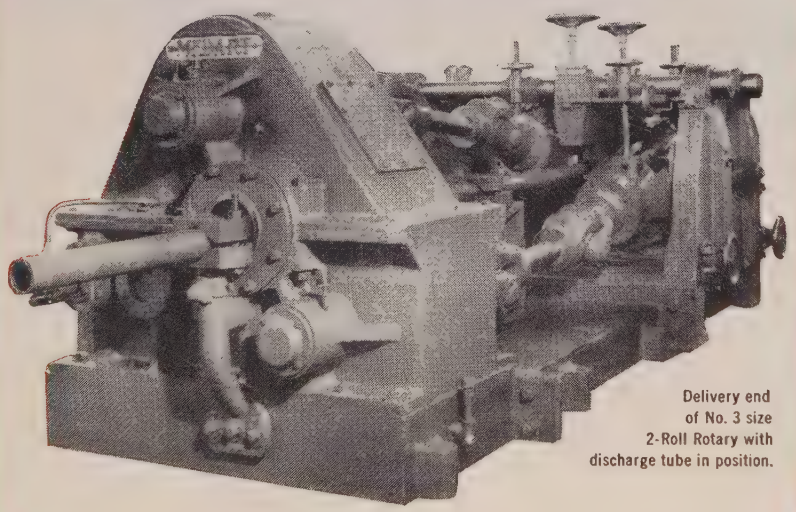
Single Motor Type—10 Different Sizes For All Requirements



Delivery end of No. 3 size 2-Roll Rotary with discharge tube in position.

- Precision straightens, sizes and polishes, and corrects out-of roundness, from end to end, on any round ferrous or non-ferrous workpiece
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- Puts a super finish on cold-drawn, turned and ground stock
- Removes mill scale from hot-rolled surfaces
- Improves the physical properties of the workpiece
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CALENDAR OF MEETINGS

† Denotes first listing in this column.

January 8, Mining & Metallurgical Society of America: Annual meeting, Mining Club, New York. Society address: 11 Broadway, New York.

January 8-10, National Constructors Association: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 50 E. 41st St., New York. Secretary: C. B. Bronson.

January 13-15, Institute of Scrap Iron & Steel: Annual meeting and exhibit, Waldorf-Astoria Hotel, New York. Institute address: 1729 H St. NW, Washington. Executive vice president: Edwin C. Barringer.

January 14-17, American Management Association: General management conference, Biltmore Hotel, Los Angeles. Address: 330 W. 42nd St., New York.

January 14-17, Plant Maintenance Show: Convention Hall, Philadelphia. Manager: Clapp & Poliak Inc. Address: 341 Madison Ave., New York.

January 14-18, Society of Automotive Engineers: Annual meeting & engineering display, Hotel Book-Cadillac, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

January 16-17, Steel Shipping Container Institute: Winter meeting, Pierre & Hampshire House, New York. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

January 16-18, Southern Industrial Distributors Association: Mid-year meeting, Edgewater Gulf Hotel, Biloxi, Miss. Association address: 208 Peachtree Arcade, Atlanta 3. Secretary: E. L. Pugh.

January 17, American Coke & Coal Chemicals Institute: Western regional meeting, Congress Hotel, Chicago. Institute address: 711 14th St. NW, Washington. Executive secretary: Samuel Weiss.

January 18, Malleable Founders Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society address: 1800 Union Commerce Bldg., Cleveland. Secretary: Lowell D. Ryan.

†**January 18-19, American Medical Association, Council on Industrial Health:** Annual meeting, William Penn Hotel, Pittsburgh. Association address: 535 N. Dearborn St., Chicago 18. Secretary: Dr. C. M. Patterson.

January 21-22, Industrial Furnace Manufacturers Association: Mid-Winter meeting, Schenley Hotel, Pittsburgh. Association address: 420 Lexington Ave., New York 17. Secretary: V. P. Gopcevic.

January 21-24, American Roadbuilders Association: 50th anniversary meeting, Hotel Rice, Houston. Association address: 1319 F St. NW, Washington 4. Secretary & executive vice president: Lt. Gen. Eugene Reybold.

January 21-25, American Institute of Electrical Engineers: Winter general meeting, Hotel Statler, New York. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

January 23-24, National Industrial Conference Board: Winter meeting, Waldorf-Astoria Hotel, New York. Address: 247 Park Ave., New York 17. Assistant director, conference division: Mrs. I. E. Brown.

January 24-25, Steel Plate Fabricators Association: Annual meeting, Palmer House, Chicago. Association address: 37 W. Van Buren St., Chicago 5. Secretary: J. Dwight Evans.

January 27-31, Associated Equipment Distributors Association: Annual meeting, Hotel Stevens, Chicago. Association address: 360 Michigan Ave., Chicago. Secretary: P. D. Herman.

†**January 28-30, Truck-Trailer Manufacturers Association:** Annual meeting, Shamrock Hotel, Houston. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

†**January 31-February 1, American Society for Metals:** Mid-Winter meeting, William Penn Hotel, Pittsburgh. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

Steel Density Controlled

Finished and semifinished products held to density and analysis in Canadian process

PROCESS and methods for producing finished and semifinished steel products having any desired density and analysis within a wide range has been developed by the Ontario Research Foundation, Toronto, Canada. Fine iron ore is made directly into the desired steel shape without melting or any other intermediate step. Dry, prepared ore generally finer than 60 mesh, is poured directly into suitable molds, reduced at 2000° F and is finally held for several hours at this temperature.

Resultant article has the composition and structure of normal steel except that it contains a predetermined amount of spherical voids which are not interconnected. This point is most important, since the cellular structure of the steel allows it to be heated and hot-worked without any great precautions being necessary to prevent excessive oxidation and scaling.

Expected Uses—Future applications of this new engineering material include hot worked material, substitute for iron powder, and light steel. The steel can be produced with any density from 1.0 to 7.0 grams per cubic centimeter directly from the furnace, and with carbon contents ranging from 1.0 to 1.5 per cent.

A wide variety of alloys have been produced by this method. If the final form of steel is to be rods, bars or wire, the iron is poured into a paper tube or porous mold such as a Croning sand mold or porous graphite mold. Tubes full of ore are placed in a metal or ceramic sagger which then is filled with a mixture of coke breeze and limestone and sealed. The loaded container is then heated to 2000° F and held for sufficient time to produce the desired carbon content and density. The latter depends upon the swelling or shrinking characteristics of the iron ore, on the maximum particle size, and the particle size distribution. For hot working, the density of the steel coming from the furnace must be more than 3.0 and preferably over 4.0.

Hot-Worked by Swaging—Resulting bars are removed from the saggers after they have cooled to about 100° F and may be reheated and hot-worked by swaging. When reduced in cross sectional area by more than 80 per cent in the hot swaging operation the tensile properties, elongation, reduction of area and hardness of the bars correspond closely to the mechanical properties of ordinary steel of the same composition in the same stages of processing.

Bars or rods then can be further cold worked and will attain the normal mechanical properties for cold drawn steel bars of the same analysis.

Hot working and forging of other shapes can be carried on easily as long as the shape is totally enclosed on four sides during working. The first working must be gentle but once a density of 7.5 or more has been obtained, hot working may proceed in the same way as with ordinary steel. Usual methods of annealing, hardening and subsequent bringing the steel to the desired physical properties are the same as ordinary steels.

Out of the Laboratory—An exploratory pilot run now is underway in an electrically-heated tunnel kiln 65 feet long. When parts as produced from the furnace are used directly without further hot or cold working it is possible to use iron ores containing large amounts of impurities. Since the metal never passes through a liquid stage it is only necessary to keep such impurities as silica down to an acceptable level for the end use of the article.

hydraulic fluid temperatures
GUARDED THE SAFE WAY
on Lombard extrusion presses

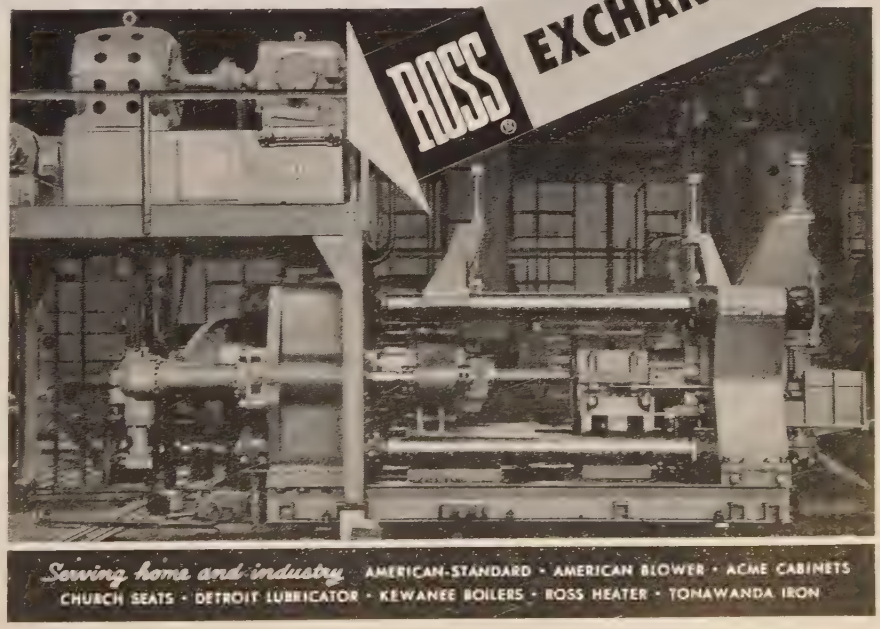
In wide use throughout the copper, brass and aluminum industries of United States and Canada are numerous Lombard hydraulic extrusion presses like the 4-column, 1100-ton model shown.

Because the manufacturer, Lombard Corporation of Youngstown, Ohio, stresses careful engineering of all design details, it is only natural that a Ross Exchanger is assigned the responsibility of guarding fluid temperatures in the pumping unit. Performance-proved Ross Exchangers fit in with Lombard's theme of economic operation and long life.

Most manufacturers of hydraulic equipment concur with Lombard in their selection of fully standardized, all-copper and copper alloy Ross Type BCF Exchangers. Their availability from stock and compact, shell-and-tube construction cut many a corner in machine design.

For full details, request Bulletin 1.1K5.

ROSS HEATER & MFG. CO., INC.
Division of American Radiator & Standard Sanitary Corporation
1431 WEST AVE. BUFFALO 13, N. Y.
In Canada, Horton Steel Works, Limited, Fort Erie, Ont.



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STERLING'S No. 2
DO BETTER
HOW MUCH EASIER
THEY ARE TO REPLACE!
STERLING SEGMENTS
MADE AT
TIFFIN OHIO
THE WHEELS OF INDUSTRY
STERLING
GRINDING WHEELS
Plus VALUE
ABRASIVE PRODUCTS
FOR
• BETTER GRINDING
• FASTER GRINDING
• LOW COST GRINDING
THE STERLING GRINDIN

New Products and Equipment

Counterweight Ups Load Center

USE REPLY CARD—CIRCLE No. 1

Optional three-piece added counterweight that brings the model 20 truck up to 2000 pounds capacity at 24-inch load center is announced by Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg. Previous standard 2000-pound model was rated at 15-inch load center. Upright assemblies and load arm pins permit use of the counterweight on this model, increasing or decreasing load-center or load capacity as the need is required. Optional counterweight bolts to machine's rear with eight capscrews.

. . . at 2000 pounds, a 24-inch load center

Also available is an optional skeleton counterweight, replacing the standard unit, that reduces truck's weight 600 pounds. With the skeleton model installed, truck is rated 1300 pounds at 15-inch load center and 1000 pounds at 24-inch load center.

Automatic Turret Lathe

USE REPLY CARD—CIRCLE No. 2

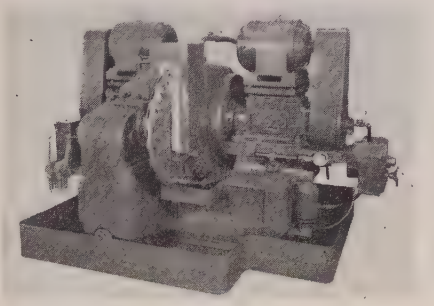
Potter & Johnston Co., Pawtucket, R. I., offers model 10-U, an addition to its line of automatic turret lathes. Designed to handle big jobs, the model is equipped with a 75-hp multi v-belt drive, magnetic clutch and brake. It has a 49-inch diameter swing over base ways, a 36-inch diameter swing over cross slides for checking and a 27-inch diameter swing over cross slides for machining.

Individual front and rear cross slides, operating from separate timing boxes, can be controlled independently or simultaneously with turret slide movement. Front and rear slides have 25½-inch adjustment along bonded tool steel base ways. These slides can be positioned through work from the rear and on the face of the workpiece as turret tools are machining. Distances from spindle to turret are a minimum 30 inches, a maximum 50 inches. Spindle speed has four automatic changes; for each set of pick-off gears, three changes are available.

Grinder Finishes Roller Ends

USE REPLY CARD—CIRCLE No. 3

Grinding equipment for finishing antifriction bearing roller ends is offered by Gardner Machine Co., Beloit, Wis. Double spindle arrangement permits grinding both ends in one operation. The 26-inch double spindle machine has a heavy cast iron base supporting heads on dovetailed slides, mounted on ball bearing ways. Heads can be pivoted to correct angle for best grinding results. Two 4-inch grinding spindles are mounted in antifriction bearings.



. . . grinds both ends in one operation

Rotary attachment, mounted on the machine's front, drives the rotary work carriers at a variable rate of speed within a ratio of 3:1. Rotary carriers are interchangeable, permitting a variety of bearing roller sizes to be ground. Bearing rollers measure 1¾ inches diameter by 1¾ inches long. Stock removal averages 0.006 to 0.008-inch overall per cut. Two cuts are necessary, each performed at the rate of 18 pieces per minute. Tolerances are 0.001-inch for parallelism and 0.002-inch for squareness and uniformity.

REPLY CARDS

on page 151 will bring you more information on any new products and equipment in this section.

Vane-Type Rotary Pump

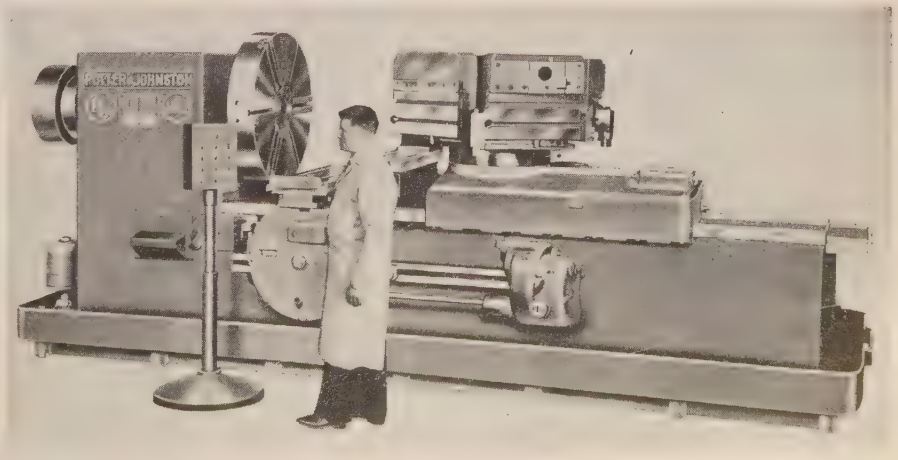
USE REPLY CARD—CIRCLE No. 4

Heavy duty vane-type pump is added to the line of rotary pumps made by Worthington Pump & Machinery Corp., Harrison, N. J. All models are positive displacement, sliding vane, in which pressure of liquid being pumped maintains contact of vanes against the liner. Units are made in both internal and external bearing design. External models are specifically suited for nonlubricating liquids such as gasoline and kerosene. Built-in relief valve is included on all models. Pumps can be made standard or bronze fitted, or in all bronze.

Counters Near Ultrasonic Rates

USE REPLY CARD—CIRCLE No. 5

Counting at near ultrasonic rates can be done on two models of Detectron electronic totalizers made by Stratex Instrument Co., 1861 Hillhurst Ave., Los Angeles 27, Calif. Designed for extreme lightness, portability and ruggedness, the models



. . . handles big jobs with 75 hp multi v-belt drive, magnetic clutch and brake

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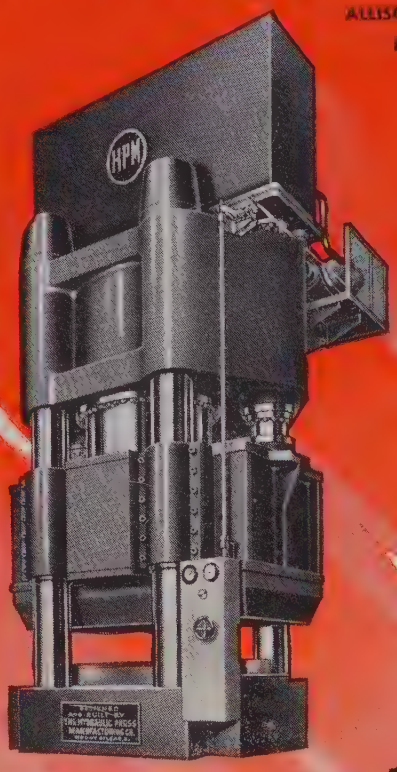

ALLISON
BEECH
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CONSOLIDATED
CURTIS WRIGHT
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FOLLAND
GENERAL ELECTRIC
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LOCKHEED
GLENN L. MARTIN
McDONNELL
NORTH AMERICAN
PRATT & WHITNEY
A. V. ROE
RYAN
SOLAR
WESTINGHOUSE

SECRET WEAPON

FOR AMERICA'S VITAL AIRCRAFT INDUSTRY

Yes, here's a secret weapon that everyone knows about—America's superior production and manufacturing "know-how". Behind every shiny jet-propelled fighter, or massive high-speed bomber there's countless machine tools that have fabricated every inch of the streamlined fuselage and knife-edged wings. One of the production machines that "flies high" in the aircraft industry is the H-P-M Fastraverse press. Thirty-seven of these "all-hydraulic" H-P-M giants, ranging from 2000 to 7000 tons, have been built for the aircraft industry . . . four more (three 7000 ton and one 5000 ton) are now under construction. In addition to these large capacity presses, countless other type H-P-Ms are turning out a great variety of parts for both airframe and aircraft engine manufacturers.

Regardless of your metal working problem, there's an H-P-M to handle the job. H-P-M presses are completely self-contained, all-hydraulic — quick to set up, simple to operate, and low on upkeep. Write today for complete information on a specific application of H-P-M presses.

Bulletin 5005 describes H-P-M Metal Working Presses. Write today for your free copy.

HPM

THE HYDRAULIC PRESS MFG. COMPANY

1044 MARION RD., MT. GILEAD, OHIO, U.S.A.

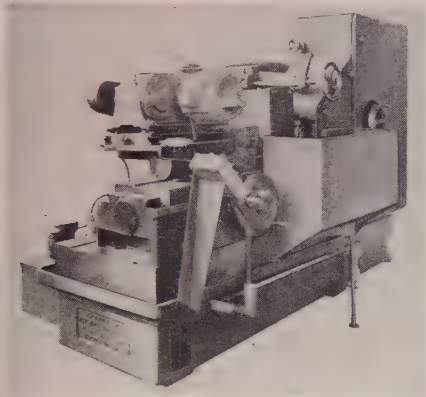
Makers of Presses for the Metal Working and Processing Industries - Plastics Molding Presses - Die Casting Machines Hydraulic Pumps, Valves and Power Units.

each weigh 10 ounces, have overall dimensions of 1½ x 5 x 5½ inches. Model TU-9 records impulses to 30,000 per second; model TU-100 records at rates to 100,000 cycles per second. Both models have octal base plugs for individual or series mounting with other equipment or circuits. Panels illuminated internally provide instant and direct reading of near astronomical proportions. Power supply is 200-400 v, dc at 12 milliampere; input-output pulse is 100 v, negative.

Grinder Uses Abrasive Belts

USE REPLY CARD—CIRCLE No. 6

Heavy duty centerless grinding machine that removes large amounts of materials at fast feeding speeds while maintaining close tolerances is offered by Production Machine Co., Greenfield, Mass. Unit differs from conventional centerless grinders in its use of abrasive belts in place of



. . . abrasive belts replace hard wheels

hard wheels for most cutting and feeding members.

As a feeding unit, belt maintains constant contact with the work at all feeding angles. It eliminates the need of dressing when either feeding angle or size of work is changed, thus cutting setup time. Cutting belt is 9 x 168 inches and runs over contact wheel and idler pulleys in triangular arrangement. This design reduces floor space requirements from those required by conventional idler backstands. Machine's capacity is ¼ to 6 inches, handling work by infeed or through-feed methods.

Machine Grinds Carbide Tools

USE REPLY CARD—CIRCLE No. 7

Carbide tool grinding and lapping machine, model 27, made by Safag, Bienne, Switzerland, is offered by Carl Hirschmann Co., 30 Park Ave., Manhasset, N. Y. The grinder is applicable for hard metal tools on any kind of Swiss-type screw machines. Diameter of its grinding wheel is 5.9 inches, maximum shank size of tool to be ground is 0.8 x 1 inch. It requires power of 0.7 hp. Special equipment for turning tool, collet gripping, planing tools, drills and chip-breaker groove is included.

Surge Comparison Tester

USE REPLY CARD—CIRCLE No. 8

Locating insulation faults and winding dissymmetries in motors, alternating and direct current generators, transformers and coils is the function of an industrial electronic surge comparison tester available from Westinghouse Electric Corp., Pittsburgh 30, Pa. Tester is available in either mobile or portable models. Its flexibility in application and simplicity of operation are designed to make it adaptable to both manufacturing and repair work.

Unit simultaneously tests turn-to-turn, phase-to-phase and coil-to-ground insulation with potentials high enough to simulate power circuit transient stresses. In every test setup, high-frequency and high-potential qualitative tests of resistance, impedance and turn balance

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STEAM CLEANER
RINSE
as you
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with the same
MACHINE
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CLEANER
LOOK AT ALL THE OTHERS and you'll decide on the new Model HR Clayton dual-purpose Steam Cleaner. No other cleaning machine has so much, or does so much, for so little. Mail the coupon today and get your FREE copy of a book that shows you, step by step, how to make real profit out of your wash rack by installing a Model HR Clayton Cleaner.
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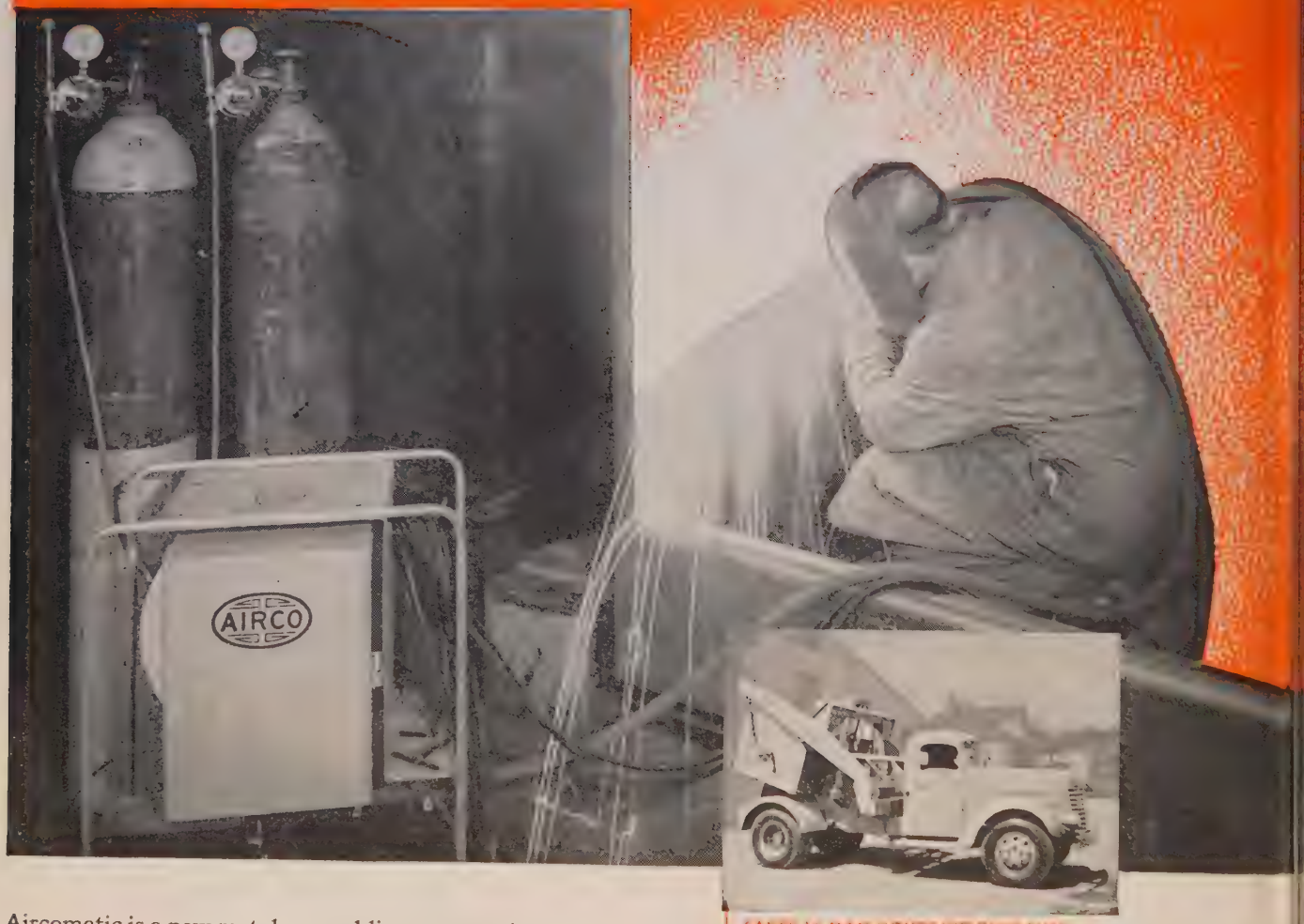
NEW Aircomatic® Process jumps Welding Speeds to NEW HIGHS



Aircomatic is a new metal arc welding process that permits high-speed welding of aluminum, of aluminum bronze and of stainless steel—*in all positions*..

The process uses a bare wire electrode in coil form, continuously fed to the work within an inert gas shield. High current densities are used providing excellent penetration and high deposition rates, *permitting welding at speeds greater than ever before possible.*

Aircomatic welding has proved most economical . . . for its high deposition rate, in addition to permitting high travel speed, also makes possible fewer passes on heavy material, and faster, heavier deposits for overlay or build-up work. This means more weld per unit of arc time, whatever the job. Further, since the wire is bare and continuously fed through a shield of inert gas, electrode changes and slag removal interruptions are eliminated, thus permitting almost 100% arc time in using the high operating speeds.

SAVES 16 MAN-HOURS WELDING TIME . . . Dempster Brothers, Incorporated of Knoxville, Tenn., makers of the nationally-known "Dempster-Dumpster" found Aircomatic welding cut their aluminum container manufacturing costs.

The other method was slow — cumbersome, and ran the cost exceedingly high. With Aircomatic the same container was produced — at a welding cost reduction of approximately 16 man-hours.

Another important feature of Aircomatic welding is its minimization of distortion. This is due to its high speed operation (heat can be concentrated and moved rapidly along the work), plus the fact that a small amount of weld metal is all that's required in most joints.

The case studies on the opposite page show how this dramatic new welding process is helping others. While the facts and figures are startling, they could very easily be applied in your own shop . . . but find out for sure. Write . . . or phone your nearby Airco office. Ask for a copy of ADR 66: "Aircomatic Welding Process".

SAVES 4½ HOURS... Martin-Quaid Co., of Philadelphia, Pa., used the New Aircomatic Process to reduce the time and cost of welding huge stainless steel cylinders used in the manufacture of carpets. They found this revolutionary process cut materials cost 25% . . . and saved 4½ hours working time over the old method — and, at the same time, greatly increased the quality of the finished product.

REDUCES TIME 4/5's . . . Consolidated Welding and Engineering Company, of Chicago, Ill., adopted the new Aircomatic process for welding aluminum separators. Immediately, major production and cost problems were solved: To weld one complete separator assembly took only 90 man hours — about 1/5 the time of other methods.

Further, Aircomatic's high current density and the attendant high welding speed confined the heating effects to the narrow weld-zone . . . completely eliminating distortion.

ELIMINATES LEAKS... Griffin & Company, of Louisville, Ky., found Aircomatic's high speed and the ability to make welds without interruption ideally suited to the fabrication of tanks for all-aluminum evaporative coolers. Production time and cost was cut to the minimum, and warpage and distortion were completely eliminated. Thus far, the company has made hundreds of these tanks without a single leak.

BOOSTS PRODUCTION 71% . . . The Stewart-Warner Corporation, South Wind Division, Indianapolis, Ind., join the upper and lower halves of its "Safe-Air Gas Home Heater" with the completely new, high-speed Aircomatic Process. This time-saving, cost-cutting process skyrocketed production 71% . . . and cut manufacturing costs in proportion.

A new Aircomatic motion picture "The Tool For The Job" is available for specialized groups. Ask your nearest Airco office about showings.

AIRCO

AIR REDUCTION

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Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

eliminate a cleaning operation by "bright" hardening in a

HEVI DUTY PIT TYPE CONVECTION FURNACE

Beryllium copper parts come out of this Hevi Duty Pit Furnace clean and bright — ready for the production line. Cutler-Hammer, Inc. has eliminated a costly cleaning operation by "bright" hardening in this Hevi Duty Pit Furnace. Prepared Atmospheres are supplied by a Hevi Duty CU-200 Gas Preparation Unit. Learn more about "bright" hardening and annealing in Hevi Duty pit furnaces. Write for Bulletin HD-451 — Today.

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DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

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are made. Results are obtained by a single scope observation. High turn-to-turn voltages are applied without excessive winding-to-ground stresses. Nondestructive testing is assured, even on fractional horsepower motors and generators.

Oven Has Eight Drawers

USE REPLY CARD—CIRCLE No. 9

Eight-drawer portable electric oven is added to the line made by Grieve-Hendry Co. Inc., 1101 N. Paulina St., Chicago 22, Ill. Its use on production lines speeds work and cuts handling costs where parts or materials require preheating, drying or baking. Drawers' design permits baking different materials at the same time or allows materials to be inserted at intervals. High temperature magnesium strip heaters provide efficient heating. Designated model TD, its light weight of 118 pounds makes moving easy.

. . . where parts need preheating, drying

Temperature control can be adjusted by thermostat to 325° F. Adjustable damper controls the volume of air circulation. Ovens can be used in a group or battery or stacked one on top of the other. Drawers are 2 inches high, 11½ inches wide, 23 inches deep.

Gas Fired Unit Heaters

USE REPLY CARD—CIRCLE No. 10

Reduction in unit heater weight and bulk, plus faster response to thermostatic control are offered in a line of gas-fired unit heaters made by Modine Mfg. Co., Racine, Wis. Heat exchanger and burners are stainless steel for maximum resistance to rust and acid action of corrosive gases. Use of stainless also reduces lag in tube warm-up, permitting faster heat delivery on thermostatic demand. Exchanger tubes are die-formed to provide their own individual compression chambers. Each tube is individually fired to get effective and uniform transfer of heat from gas flame to heating surface and heat all tubes evenly.

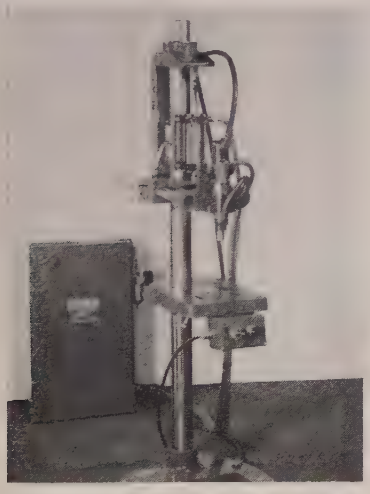
Elongated burner ports have great-

er free area than conventional drilled ports, minimizing clogging and maintenance. Units are offered in five sizes from 65,000 to 165,000 Btu input per hour. All models have built-in draft diverters, automatic safety control, bonderized casings and built-in fan guards.

Standard Production Welder

USE REPLY CARD—CIRCLE No. 11

Normal capacity of three to six welds per minute can be increased to 15 to 20 welds with accessory equipment, on a standard production stud welder offered by Stud Welding Division, KSM Products Inc., Merchantville, N. J. Welder is a heavy duty, adjustable unit designed to weld studs from ⅛ to ¾-inch diameter and ¾-inch or more in length. It operates on standard direct welding current while control circuit operates on 110 v, 60 cycle ac.



. . . capacity hits 20 welds per minute

Control unit includes timers and air pressure regulator. Control is designed so that accessories, such as indexing table and automatic vise, can be plugged easily into outlets built into the control unit. Throat up to 18 inches is available with the welding head. Shut height can be varied from 0 to 30 inches and head can be rotated 360 degrees around the main column.

Truck Converted to Die Handler

USE REPLY CARD—CIRCLE No. 12

Fork trucks in the JOM series, made by Baker Industrial Truck Division, Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, O., can be converted easily to handle dies. Conversion is accomplished by a power winch mounted in the battery compartment of the 7000, 8000 or 10,000-pound capacity trucks. Die handling is done without interference with hauling and tiering efficiency. All parts of the winch except reels and cables are enclosed in the truck's battery compartment. Cables running from the winch to the die are guided over rollers on truck's side plates to prevent friction between cable and body surface.

Machine Grinds Bucket Blades

USE REPLY CARD—CIRCLE No. 13

Machine that brings drilling and tapping tools to the work in angular and inverted positions is a development of Boice-Crane Co., 1018 Central Ave., Toledo 6, O. The setup was devised for simultaneous machining and single handling of a part or assembly to speed production of the company's welded all-steel jointers. Application of automatic and semi-automatic pneumatic feeding devices is made to three universal five-speed heads.

Graphotype Is Tape Controlled

USE REPLY CARD—CIRCLE No. 14

Automatic Graphotype machine that is controlled entirely by perforated tape with no need for manual

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GITS First!
GITS Bros. covers the entire range of lubricating devices: Oil Hole Covers, Oil Cups, Grease Cups, Bottle Oilers, Gauges. Gravity-Feed, Wick-Feed, Constant Level, Vibrating Rod styles. Threaded or Drive-type. Elbow or Straight.
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Chicago	Houston†	Newark	Rochester†	office only)
Cincinnati	Indianapolis	New Orleans	St. Louis	

CHASE 75th ANNIVERSARY 1876 1951

operation of the keyboard is announced by Addressograph-Multigraph Corp., 1200 Babbitt Rd., Cleveland 17, O. This method of operation increases rate of production of embossed plates for individual machines plus permitting one attendant to supervise operation of as many as ten units in multiple machine operation. Perforated tapes employed are prepared on either Teletype tape perforator or Flexowriter and are interchangeable.

Stock Checker's Truck

USE REPLY CARD—CIRCLE No. 15

Stock checker's truck designed to handle a variety of parts is offered by Palmer-Shile Co., 16025 Fullerton Ave., Detroit 27, Mich. Truck is of all-steel construction; has three steel shelves with 1-inch flanges to hold materials. To facilitate checkers' work, a writing table and stationery

. . . writing table eases checker's work

rack are welded to the frame. Tubular steel handle extends to form a protective bumper for the rack. Floor clearance is 9½ inches; overall height to top shelf, 42½ inches; height between center and top shelves, 12 inches; between lower and center shelves, 20 inches. Truck is 44 inches long, 20 inches wide.

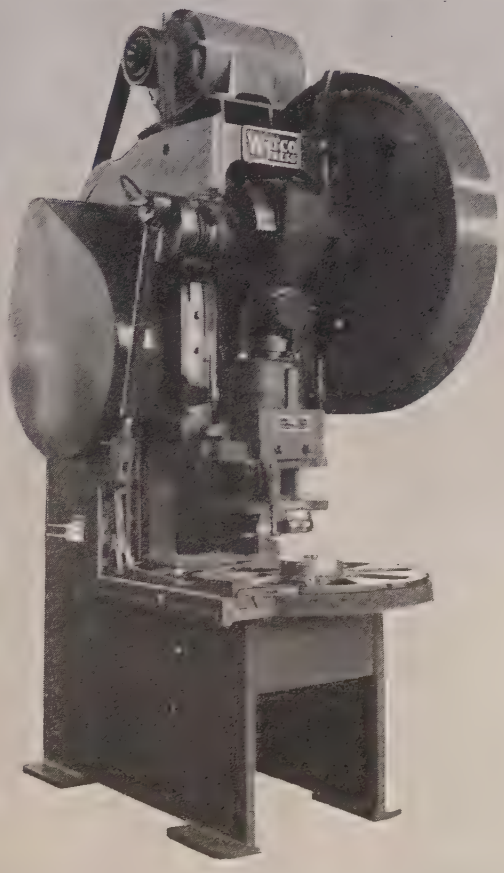
Depth Control Tampering Cut

USE REPLY CARD—CIRCLE No. 16

Precision-Guard that clamps over precision depth control dial of the company's time saver drill feed and prevents tampering is announced by General Pacific Corp., 1501 E. Washington Blvd., Los Angeles, Calif. Safety unit adds further control over rejects and reduces drill breakage. Its use helps assure positive, precision

Warco®

Production minded dial feed press completes automotive filter assembly every two seconds . . .



This Warco 75-ton, single crank, straight side Gap Press simultaneously performs two separate operations on the assembly of an oil filter for automobile crankcases — as fast as an operator can load the eight-station dial feed — and with maximum safety to operator as loading station is in the clear of press slide.

The screen that makes up the filter and the frame for the filter, in a 90° flanged condition, is placed into spring loaded dogs in the dial openings. These progress to the first die on the slide which makes a 45° closing on the flanges . . . then to the second die which closes and coins the flanges, producing a completely assembled unit at each stroke of the press. The completed piece then progresses to the next station where it is automatically ejected by a spring loaded pusher arm.

If you have special requirements on your press operations let Warco engineers know about it . . . contact the Warco representative nearest you or write direct . . . it will pay dividends.

Federal® WELDERS

THE FEDERAL MACHINE & WELDER COMPANY

WARREN, OHIO

Warco PRESSES®

Advertisement

ELECTROMET Data Sheet

Published by Electro Metallurgical Company, A Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

ALLOYS FOR THE STEEL, IRON, AND NON-FERROUS INDUSTRIES

PRODUCT*	NOMINAL COMPOSITION	USES
BORON ALLOYS		
Ferroboron Min. 10.00% Boron Grade	Silicon.....max. 1.50% Aluminum.....max. 0.50% Carbon.....max. 1.50%	Increases hardenability of steel; also, for additions to malleable iron and aluminum alloys.
Min. 17.50% Boron Grade	Silicon.....max. 1.50% Aluminum....max. 0.50% Carbon.....max. 0.50%	
Manganese-Boron	Boron.....min. 17.50% Manganese...approx. 75% Silicon.....max. 1.50% Carbon.....max. 3% Iron.....max. 5%	Used to cleanse and deoxidize non-ferrous alloys.
Nickel-Boron	Boron.....15 to 18% Silicon.....max. 1.50% Aluminum....max. 1.00% Carbon.....max. 0.50% Iron.....max. 3.00% Nickel.....Balance	Special boron alloy used principally for deoxidizing nickel and its alloys.
Boron Carbide	Boron.....45 to 50% Carbon .....45 to 50%	Deoxidizer for non-ferrous alloys.
Calcium Boride	Boron.....38 to 42% Calcium.....27 to 32% Carbon.....15 to 20%	Welding rod coating.
SILCAZ Alloy	Boron.....0.55 to 0.75% Silicon.....35 to 40% Calcium.....9 to 11% Aluminum.....6 to 8% Titanium.....9 to 11% Zirconium.....3 to 5%	A complex boron addition agent for increasing the hardenability of steel.
CALCIUM ALLOYS		
Calcium-Silicon	Calcium.....30 to 33% Silicon.....60 to 65% Iron.....1.50 to 3%	Deoxidizer for quality ingot steel. Also used in high-tensile gray irons.
Calcium-Manganese-Silicon	Calcium.....16 to 20% Manganese.....14 to 18% Silicon.....53 to 59%	A complex deoxidizer used widely in production of steel castings.
Calcium Metal		
Regular Grade	Calcium.....98% (Cylinders, Slabs, Cut Pieces, or Turnings)	Reducing agent in metallurgical applications, deoxidizer and degasifier for non-ferrous metals, particularly magnesium.
Distilled Grade	Calcium...approx. 99.90% (Irregular pieces from pea size to 14 in. lumps)	For special applications requiring calcium of very high purity.
CHROMIUM ALLOYS		
Low-Carbon Ferrochrome	Chromium.....67 to 71% Silicon.....0.30 to 1.00% Carbon (10 Grades) max. 0.03 to max. 2.00%	Production of stainless steels and high-temperature alloys requiring low carbon content.
High-Carbon Ferrochrome		
Max. 4.50, 5.00, or 6.00% Carbon Grade	Chromium.....67 to 70% Silicon..... 1 to 2%	For production of engineering alloy steels and other alloy steels of moderate chromium content.
Max. 7.00% Carbon Grade	Chromium.....66 to 69% Silicon..... 1 to 3%	
Min. 7.00% Carbon Grade	Chromium.....65 to 68% Silicon..... 1 to 3%	
Nitrogen-Bearing Low-Carbon Ferrochrome	Chromium.....67 to 71% Silicon.....0.30 to 1.00% Carbon.....max. 0.10% Nitrogen....approx. 0.75%	For additions of nitrogen to improve properties of high-chromium steels.
"SM" Ferrochrome	Chromium.....60 to 65% Silicon ..... 4 to 6% Carbon..... 4 to 6% Manganese..... 4 to 6%	A high-solubility chromium addition for steel or iron in either furnace or ladle.

PRODUCT*	NOMINAL COMPOSITION	USES
CHROMIUM ALLOYS cont.		
Foundry Ferrochrome High-Carbon Grade	Chromium.....62 to 66% Silicon..... 7 to 10% Carbon..... 5 to 7%	Developed especially for high-solubility ladle additions of chromium to improve composition and properties of cast iron.
Low-Carbon Grade	Chromium.....50 to 54% Silicon.....28 to 32% Carbon.....max. 1.25%	
Chromium Metal Low-Carbon Grades	Chromium.....min. 97% Carbon .....max. 0.10% and 0.50% Iron.....max. 1%	Production of wide variety of non-ferrous chromium-bearing alloys including electrical resistance alloys and high-temperature alloys.
High-Carbon Grade	Chromium.....87 to 90% Carbon..... 9 to 11% Iron.....max. 1.25%	
"EM" Ferrochrome-Silicon No. 1 Grade	Chromium.....39 to 41% Silicon.....42 to 46% Carbon.....max. 0.05%	In production of stainless steels, these alloys are used to reduce metal oxides from the slag back into bath.
No. 2 Grade	Chromium.....36 to 39% Silicon.....36 to 39% Carbon.....max. 0.05% Aluminum..... 7 to 9%	
"EM" Ferrosilicon-Chrome	Chromium.....50 to 54% Silicon.....28 to 32% Carbon.....max. 1.25%	For adding chromium and silicon to steels containing up to 1 or 2 per cent chromium.
"EM" Chromium Briquets (Hexagonal Shape)	Chromium.....2 lb. Total Weight.....3⅜ lb.	For adding chromium to cast iron in the cupola.
COLUMBIUM ALLOYS		
Ferrocolumbium	Columbium.....50 to 60% Silicon.....max. 8% Carbon.....max. 0.40%	Stabilizer in austenitic chromium-nickel stainless steels. Also constituent of high-temperature alloys.
Ferrotantalum-Columbium	Columbium...approx. 40% Tantalum.....approx. 20% Cb+Ta .....min. 60% Silicon.....4 to 6% Carbon.....max. 0.30%	Another stabilizer, used to supplement ferrocolumbium, in austenitic chromium-nickel stainless steels. Also used in high-temperature alloys.
MANGANESE ALLOYS		
Standard Ferromanganese Regular Grade	Manganese.....78 to 82% Carbon.....approx. 7% Silicon.....max. 1%	Most common means of adding manganese to steel for both alloying and deoxidizing purposes. Also for counteracting sulphur in steel and cast iron.
Low-Phosphorus Grade	Manganese.....78 to 82% Carbon.....max. 7% Silicon.....max. 2% Phosphorus...max. 0.10%	
Low-Carbon Ferromanganese Low-Phosphorus Grade	Manganese.....min. 90% Carbon.....max. 0.07% Phosphorus...max. 0.06%	Additions of manganese to steels of low-carbon specification, particularly stainless steels of 18 per cent chromium, 8 per cent nickel type.
Regular Grades	Manganese.....85 to 90% Carbon....max. 0.07, 0.11 to 0.15, 0.30, or 0.50%	
Regular Grade (High-Silicon)	Manganese.....80 to 85% Carbon.....max. 0.75% Silicon..... 5 to 7%	
Medium-Carbon Ferromanganese	Manganese.....80 to 85% Carbon.....max. 1.25 to 1.50%	For making low- and medium-carbon manganese steel and Hadfield steel.
Silicomanganese		
Max. 1.50% Carbon Grade	Manganese.....65 to 68% Silicon.....18 to 20%	A versatile alloy used as furnace block, deoxidizer, and also for making manganese additions to steel in the ladle or in the furnace.
Max. 2.00% Carbon Grade	Manganese.....65 to 68% Silicon.....15 to 17.50%	
Max. 3.00% Carbon Grade	Manganese.....65 to 68% Silicon.....12 to 14.50%	

*All of the alloys and metals listed are produced in the usual lump, crushed, or ground sizes, except where other special forms are indicated.

PRODUCT*	NOMINAL COMPOSITION	USES
MANGANESE ALLOYS cont.		
v-Iron **rromanganese**	Manganese.....85 to 90% Carbon.....approx. 7.00% Silicon.....max. 3% Iron.....max. 2%	For high manganese additions to certain non-ferrous alloys, particularly aluminum.
nganese Metal	Manganese.....min. 96% Carbon.....max. 0.20% Silicon.....max. 1.00% Iron.....max. 2.50%	Used both as deoxidizer and alloy in production of numerous non-ferrous metals and alloys.
A" Silico- **nganese Briquets** (uare Shape)	Manganese.....2 lb. Silicon.....½ lb. Total Weight.....3½ lb.	For adding manganese (with silicon) to cast iron in the cupola.
A" Ferro- **nganese Briquets** (long Shape)	Manganese.....2 lb. Total Weight.....3 lb.	For adding manganese (without silicon) to cast iron in the cupola.
SILICON ALLOYS		
% Ferrosilicon		
gular Grade	Silicon.....47 to 51%	Deoxidizer for most grades of killed or semi-killed steel. Blocking grade specially sized for maximum efficiency.
cking Grade	Silicon.....47 to 51%	
v-Aluminum Grade	Silicon.....47 to 51% Aluminum.....max. 0.40%	
% Ferrosilicon v-Aluminum Grade	Silicon....61.50 to 66.50% Aluminum.....max. 0.50%	Mainly for production of electrical sheet steel.
% Ferrosilicon		Deoxidizer and alloy for production of high-silicon spring and electrical sheet steel. Graphitizing inoculant for cast iron.
gular Grade	Silicon.....73 to 78%	
v-Aluminum Grade	Silicon.....73 to 78% Aluminum.....max. 0.50%	
% Ferrosilicon		Enables melter to add higher percentages of silicon without chilling metal in ladle. Graphitizing inoculant for cast iron.
gular Grade	Silicon.....83 to 88%	
v-Aluminum Grade	Silicon.....83 to 88% Aluminum.....max. 0.50%	
% Ferrosilicon		Permits large additions of silicon without harmful chilling effect.
gular Grade	Silicon.....92 to 95%	
v-Aluminum Grade	Silicon. .....92 to 95% Aluminum.....max. 0.50%	
con Metal		Additions of silicon to non-ferrous metals, particularly aluminum and copper, to improve physical properties.
gular Grade	Silicon.....min. 97 or 96% Iron.....max. 1 or 2%	
ified Grade	Silicon....99.70 to 99.90% Iron.....005 to .015%	For applications in non-ferrous industry requiring silicon of high purity.
v-Calcium Grade	Silicon.....min. 97% Iron.....max. 1% Calcium.....max. 0.10%	For the production of high-silicon aluminum alloys where calcium is detrimental.
v-Aluminum Grade	Silicon.....min. 98% Iron.....max. 1% Aluminum.....max. 0.10%	For the production of silicon-copper alloys where aluminum is detrimental.
MZ" Alloy	Silicon.....60 to 65% Manganese..... 5 to 7% Zirconium..... 5 to 7%	Particularly strong graphitizing inoculant used in making ladle additions to cast iron.
ecial Graphitizer	Ferrosilicon Compound	Acts as both deoxidizer and graphitizer in cast iron. Useful in controlling chilling tendencies.
gnesium- **rrosilicon**	Silicon.....approx. 46% Magnesium..approx. 8.5%	For ladle addition to cast iron to obtain special properties.
rium-Silicon	Barium.....40 to 50% Silicon.....45 to 55%	For deoxidation of non-ferrous alloys.
M" Silicon Briquets (Cylindrical Shape)		
rge Size	Silicon.....2 lb. Total Weight.....5 lb.	For adding silicon to cast iron in the cupola.
alf Size	Silicon.....1 lb. Total Weight.....2½ lb.	

lectromet," "EM," "Silcaz," "SM," and "SMZ," are trade-marks of ion Carbide and Carbon Corporation.

PRODUCT*	NOMINAL COMPOSITION	USES
TITANIUM ALLOYS		
Ferrotitanium	Titanium.....27 to 32% Carbon.....max. 0.10%	For adding titanium to stabilized austenitic chromium-nickel stainless steels and to high-temperature metals.
Silicon-Titanium	Titanium.....40 to 50% Silicon.....45 to 50% Iron.....max. 3%	For additions of titanium to steels or non-ferrous alloys.
Manganese-Nickel-Titanium	Titanium.....43 to 48% Nickel.....approx. 25% Manganese.....max. 8% Aluminum.....max. 18% Iron.....max. 5%	Deoxidization of nickel alloys.
TUNGSTEN ALLOYS		
Ferrotungsten	Conforming to A.S.T.M. Spec. A 144-39	For production of tool and die steels; also high-temperature alloys.
Tungsten Metal Powder		Production of tungsten steels and cast tungsten carbide.
Melting Grade	Tungsten.....min. 98.80% Total Carbon..max. 0.25%	
Calcium Tungstate Nuggets	Tungstic Oxide..68 to 72%	For production of tool steels and high-temperature alloys by direct reduction.
VANADIUM ALLOYS		
Ferrovanadium	Vanadium.....50 to 55% Carbon....max. 0.20, 0.50, or 3.00% Silicon....max. 1.50, 2.00, or 8%	Production of tool and engineering steels, high-strength structural steels, non-aging rimming steels, and wear-resistant irons.
Vanadium Oxide Fused	V_2O_5.....86 to 89% Na_2O.....approx. 10% CaO.....approx. 2%	For addition of vanadium to steel and for manufacturing catalysts.
Sodium Polyvanadate (Red Cake)	V_2O_5.....approx. 85% Na_2O.....approx. 9% CaO.....approx. 2% H_2O.....approx. 2.5%	For manufacture of vanadium compounds, including vanadium catalysts.
High-Purity Ammonium Metavanadate	V_2O_5.....approx. 99.50% NH_4VO_3.....min. 99%	
ZIRCONIUM ALLOYS		
12 to 15% Zirconium Alloy	Zirconium.....12 to 15% Silicon.....39 to 43% Carbon.....max. 0.20%	This zirconium alloy is a powerful deoxidizer. It also increases depth of hardening.
35 to 40% Zirconium Alloy	Zirconium.....35 to 40% Silicon.....47 to 52% Carbon.....max. 0.50%	Deoxidizer for fine grades of alloy steels. Used for adding larger amounts of zirconium.
Nickel-Zirconium	Zirconium.....25 to 30% Nickel.....40 to 50% Aluminum...approx. 15% Silicon.....max. 10% Iron.....max. 5%	Effective for deoxidizing and degasifying nickel and its alloys.

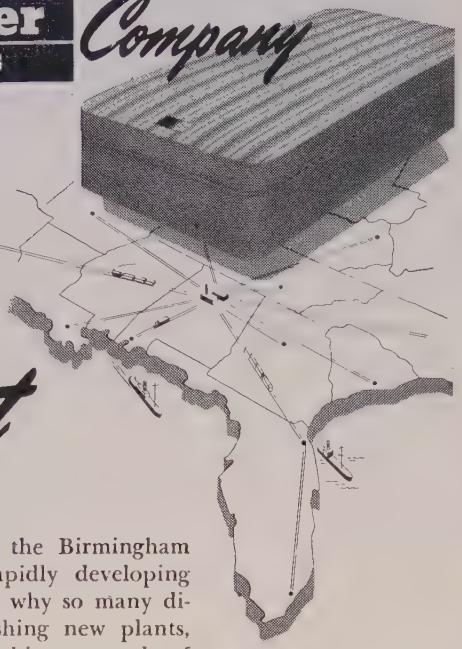
IF YOU HAVE A METALS PROBLEM

More than 50 different alloys and metals are produced by ELECTROMET in hundreds of varying compositions and sizes. If you need help in selecting the proper alloys, or have some specific metallurgical problem, be sure to consult one of ELECTROMET'S specially trained metallurgists and engineers. Address your inquiries to one of the offices listed below.

Birmingham 3, Ala.....Brown-Marx Building
Chicago 1, Ill.....230 N. Michigan Avenue
Cleveland 14, Ohio.....Union Commerce Building
Detroit 2, Mich.....6-240 General Motors Building
Los Angeles 58, Calif.....2724 Leonis Boulevard
New York 17, N. Y.....30 East 42nd Street
Pittsburgh 22, Pa.....2207 Oliver Building
San Francisco 6, Calif.....22 Battery Street
In Canada: Electro Metallurgical Company of Canada Limited, Welland, Ontario

the Englander SLEEP PRODUCTS Company

Selects Birmingham to Serve the Southeast



It's a short, fast haul from the Birmingham district to anywhere in the rapidly developing Southeast. This is reason No. 1 why so many diversified enterprises are establishing new plants, warehouses and sales offices at this crossroads of the Southeastern market.

Among recent new arrivals is the big plant of The Englander Company, Inc., manufacturers of a complete line of nationally advertised "sleep products," including the exclusive mattress of Goodyear's Airfoam with Englander's Red-Line foundation, innerspring mattresses, box springs, dual sleeping equipment.

I. M. Pink, president of The Englander Company, gave these reasons for placing the new plant in Birmingham:

"The South was a growing market for our nationally advertised products. Our expansion program called for another factory located in a strategic spot to serve the largest trading area. After a thorough survey, Birmingham was selected as another link in our chain of bedding plants from coast to coast. Right from the initial announcement of our plans to build in Birmingham, we have had an enthusiastic response from our trade."

Industries that sell in the Southeast have tremendous growth opportunities today in the Birmingham district—nationally recognized for skilled labor, ample power, abundant raw and semifinished materials, and superior transportation facilities.

* * * * * *

The Committee of 100 or any of the undersigned members of the Executive Committee will welcome the opportunity to give you confidential and specific data regarding the advantages of the Birmingham district for your plant, office or warehouse.

BIRMINGHAM COMMITTEE OF 100

1914 Sixth Ave., N., Birmingham, Ala.

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Loveman, Joseph & Loeb

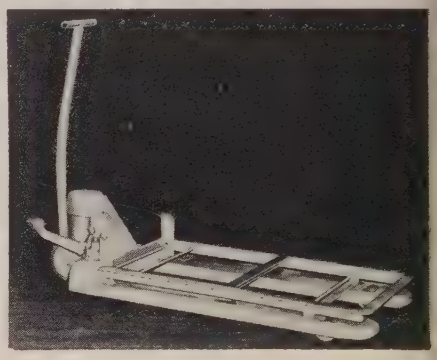
A. V. Wiebel
President
Tennessee Coal, Iron & Railroad Co

control over drilled hole depth. Company's drill feed operates from three quick-setting control dials: Depth, rapid traverse and variable hydraulic feed. Unit is an automatic power feed, operating on ordinary shop air pressure. In-line mounting atop the press controls accuracy to 0.001-inch.

Pallet Truck Handles Skids

USE REPLY CARD—CIRCLE No. 17

Skid adapter that enables conventional hand pallet trucks to lift and handle skid platforms is introduced by Raymond Corp., Greene, N. Y. Conventional pallets are low and have boards at top and bottom, requiring a special truck with a lowered height of 3¼ inches. Skid platforms, usually higher, have no bottom boards and



. . . puts skids over regular pallet forks

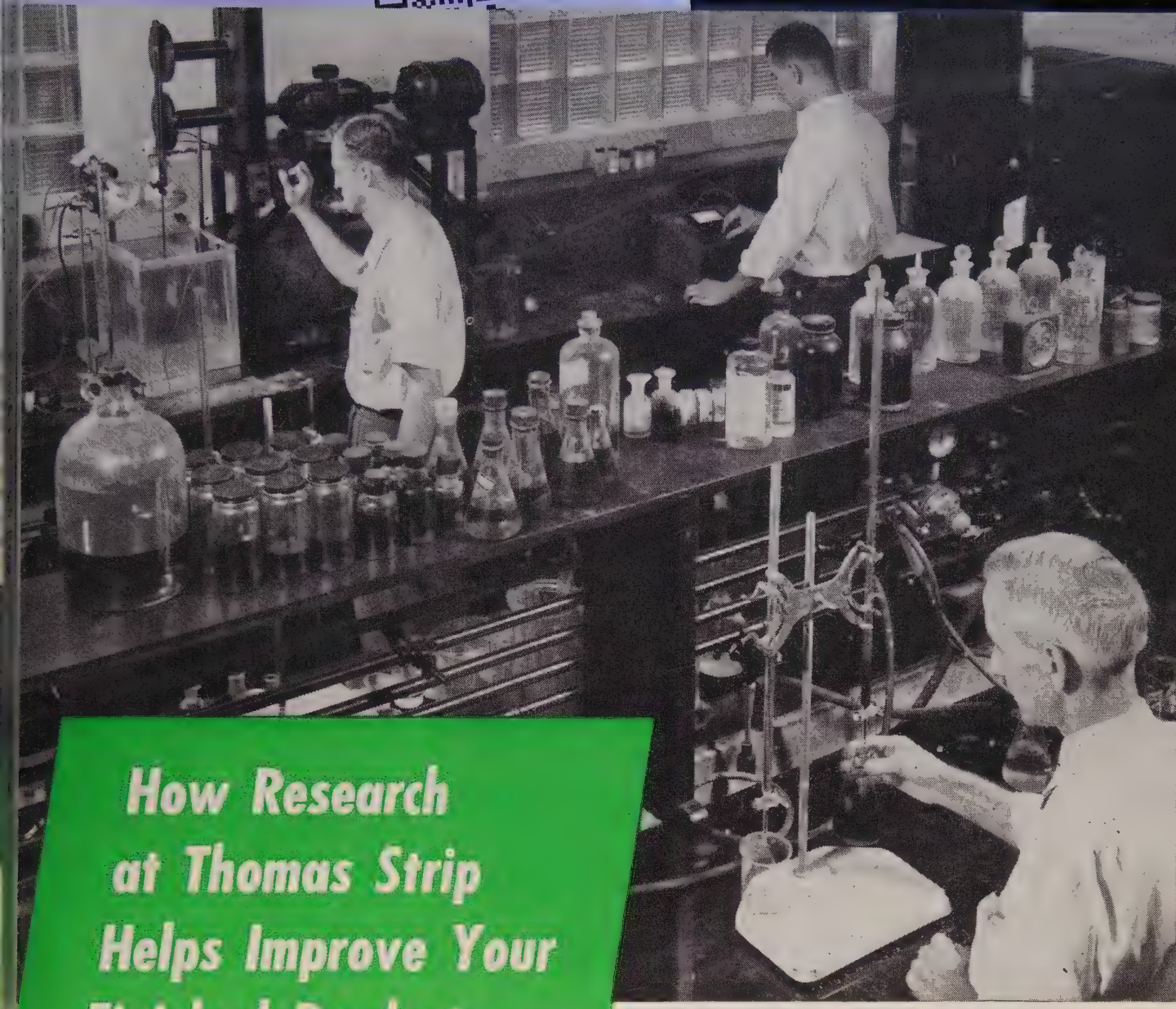
require a platform truck having only a 6 inch or more lowered height. The company offers a single truck equipped for handling both pallets and platforms through use of a hinged superstructure that can be raised out of the way when handling pallets or lowered into position when handling skid platforms.

Arbor Press Line Announced

USE REPLY CARD—CIRCLE No. 18

Arbor presses made by Benchmaster Mfg. Co., 1835 W. Rosecrans Ave., Gardena, Calif., are added to the company's line of punch presses and milling machines. Presses are available in three sizes, designated models 0, 1 and 2, and in standard and solid platen types with choice of lever or pilot wheel actuation.

To compensate for additional bending moment, column is increased gradually in size and width as it approaches the base. It is smoothly filleted at this connection. Two heavy webs further reinforce the juncture with the column. Base and column are cast integrally of high-strength semisteel. Take-up adjustments on front and side of ram insure line of straight travel as well as wear com-



How Research at Thomas Strip Helps Improve Your Finished Products

This is part of the plating research laboratory at the Thomas Strip Division of Pittsburgh Steel Company. Many specialized problems are solved—new ideas developed here.

Research has done many things at Thomas Strip — prime example of which is a unique method of pre-coating strip steel.

The use of Thomas Strip by many manufacturers has resulted in the elimination or reduction of plating costs—given their product an inside-and-out quality finish—protected their products from corrosion — eliminated several steps in a process cycle—saved them handling, preparation and cleaning costs. These are some of the advantages you enjoy by use of Thomas Strip which is pre-coated electrolytically with zinc, copper, brass, nickel and chromium. It is also hot dip tin and lead alloy coated and lacquer coated in a variety of colors to best suit your requirements.

The benefits of using pre-coated Thomas Strip have been made possible through intensive research and development work performed over the years in the laboratory and on pilot plating lines by Thomas technicians. Their accumulated knowledge, skill and experience applied to specific problems has made possible the manufacture of better products at lower costs—the conservation of scarce and critical materials.

While the accomplishments of the research staff have been many, they continue painstakingly with their work in order to progress even further in the field of pre-coating. Specific problems presented to them by customers must be solved—new products developed—new techniques created—all directed toward the one goal of helping improve your finished products by making the use of Thomas Strip practicable in your operations.

Thomas Strip

a product of

Pittsburgh Steel Company

NONE BETTER... America's First and Safest

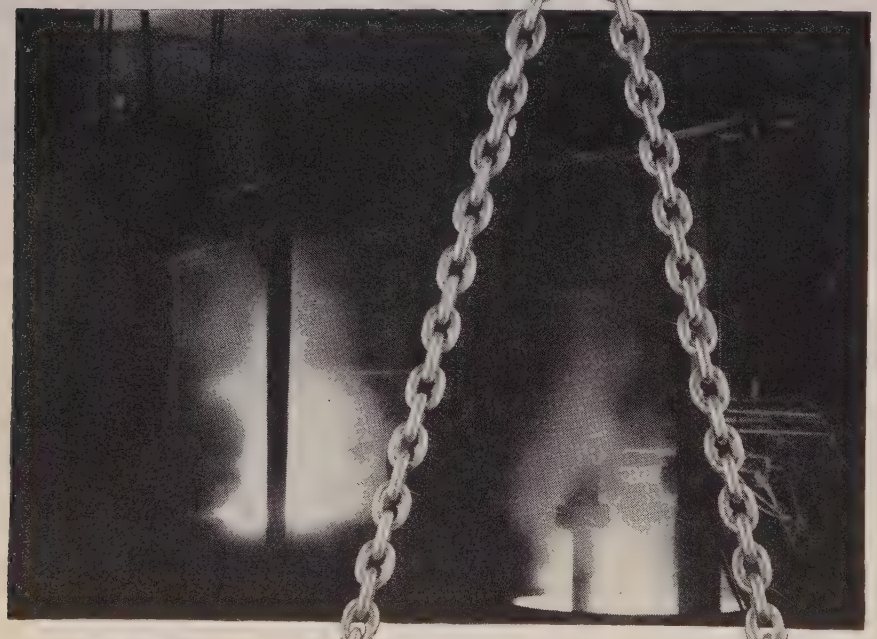
HERC-ALLOY

SLING CHAINS

STRENGTH—Size for size, no other sling chain offers a greater tensile strength. HERC-ALLOY will not crystallize—never requires annealing.

SAFETY—HERC-ALLOY Sling Chains are made to your specifications. Every new sling carries a written guarantee, is registered and tested before shipping. This registration serial number is carried at the top link.

● Serial number permanently affixed near top link for positive identification.



● Identify HERC-ALLOY by the patented Inswell side weld with the extra swell of metal on the inside of the link.

EFFICIENCY—Lighter, stronger HERC-ALLOY Sling Chains feature the exclusive short, narrow link design which holds firmer, less tendency to kink, less gouging. Workmen handle HERC-ALLOY with less effort.

PREFERENCE—Men who buy and use sling chains are influenced only by facts learned through experience. HERC-ALLOY Sling Chain preference has been built up over the years, not just by what we say, but by how HERC-ALLOY performs on the job.

Write for Data Book No. 3 which contains much useful manufacturing and application information on HERC-ALLOY Sling Chains.

COLUMBUS McKINNON CHAIN CORPORATION

(Affiliated with Chisholm-Moore Hoist Corp.)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

***District Offices:* New York • Chicago • Cleveland**

Other Factories at Angola, N. Y., Dixon, Ill., St. Catharines, Ont., and Johannesburg, South Africa.

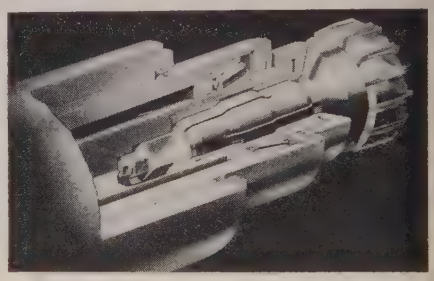
pensation adjustments. Model 0 takes 7½ inches maximum work diameter; model 1, 10 inches; and model 2, 13¾ inches.

Device Presets Cutters

USE REPLY CARD—CIRCLE No. 19

Cutter driving device that permits presetting many types of tools is announced by Cross Co., Detroit 7, Mich. Known as Cross-Drive, the arrangement features quick changing, preset cutters and spindle drive that holds the cutter rigidly and precisely. Cutters can be changed in less than a minute. Worn cutter is removed easily by sliding it out of the spindle after loosening a large lock nut.

Adjustments with preset cutters are set while machine is running. Trial cuts are unnecessary because



. . . permits presetting, quick changing

length is adjusted to a dial indicator reading within 0.0005-inch. Master length gage, supplied with the fixture establishes limits on the indicator. To assure a true running tool, straight shank of machine is gripped securely by four-point collet. A large square at the shank's end makes drive positive. An adjusting screw takes the thrust solidly against the bottom of the spindle's hold. Shank sizes are standardized in diameters of 1½, 2 and 2½ inches.

Cleaner Removes Grease, Dirt

USE REPLY CARD—CIRCLE No. 20

Steam cleaner that works on any pressure supply from 60 to 150 pounds in removing grease and dirt from machinery, equipment and floors is announced by Hypressure Jenny Division, Homestead Valve Mfg. Co., Coraopolis, Pa. Cleaner mixes steam supply with positive pumped proportions of water and cleaning solution for its cleaning, sanitizing and deodorizing actions. The unit is portable, can be rolled into place for connection with steam and water lines, and 110 v, 60 cycle ac circuit. Chemical vapor spray capacity is 45 to 90 gallons per hour. If steam supply pressure exceeds 150

We claim to be best equipped to supply your most exacting requirements in

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"LET'S LOOK AT THE RECORD"

(With due respect to the late Governor Al Smith)

. . . We have seven modern plants strategically located, designed and organized by men of 50 years' experience in the die casting field.

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. . . We cast every die-castable non-ferrous alloy used commercially.

. . . We have received the highest citations from our Government, Army and Navy in World War I and World War II.

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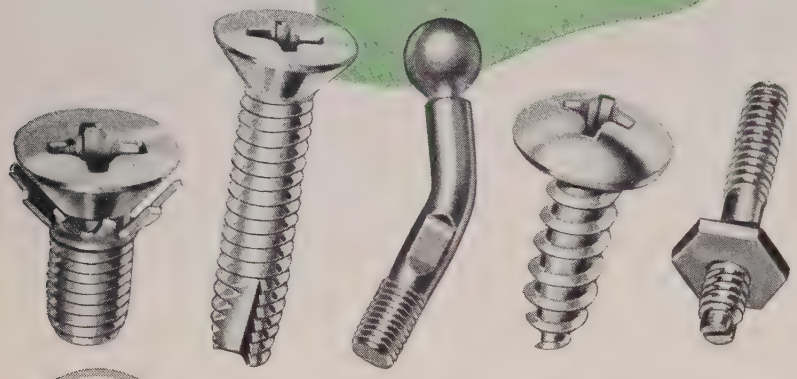
It's not the Part

But the Part You Need

and Don't Have!

That Costs You Money



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PHILLIPS HEAD SCREWS
HEX HEAD SHEET METAL SCREWS

IN ALL COLD-HEADING MATERIALS

Why pay the cost of production hold-ups, idle machine time and lost man-hours, due to lack of *special metal parts* or *fasteners?*

There's never a need to say, "Our Line is Down", when Camcar Specialists set up to supply these parts for high-volume assembly operations. Supply is their business — to see that you have these parts when you need them — made right — and to save you money.

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CAMCAR SCREW & MFG. CORP.

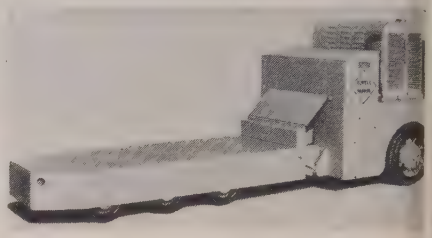
603 EIGHTEENTH AVENUE ROCKFORD, ILLINOIS

pounds, a pressure regulator can be applied. Cleaner is 37 inches long, 27 inches wide and 37 inches high; has vapor hose 25 feet long.

Truck Carries 40,000 Pounds

USE REPLY CARD—CIRCLE No. 21

Elwell-Parker Electric Co., Cleveland 3, O., offers model L-14 electric low lift platform truck designed to transport loads weighing 40,000 pounds. Chief application for the big lift is moving skids and skid boxes in plants where large loads of stampings, forgings, castings or dies and heavy machinery must be moved



. . . maneuvers with power wheel steering

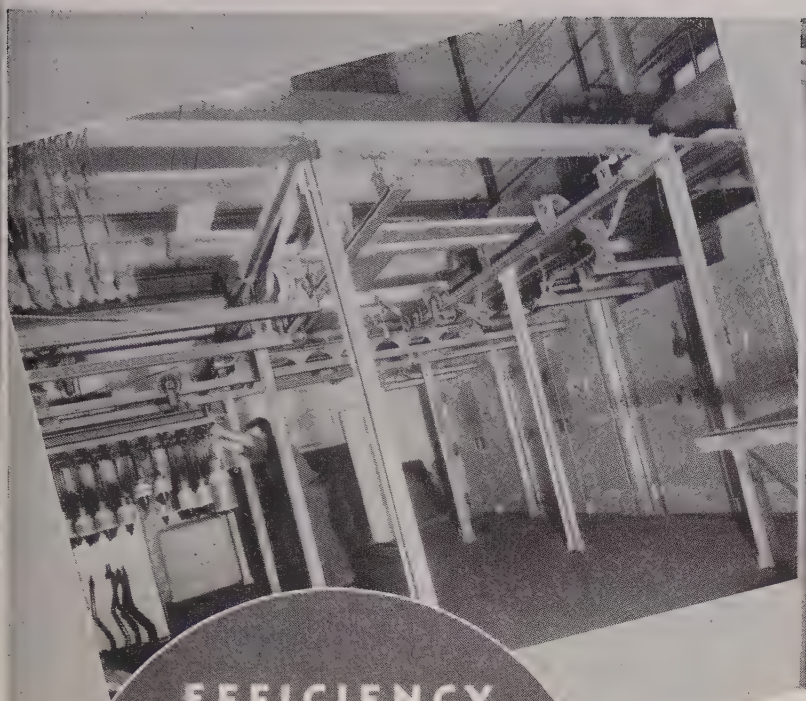
quickly and efficiently. A self-loading feature permits load platform to be raised hydraulically, lifting the load off the floor for transport.

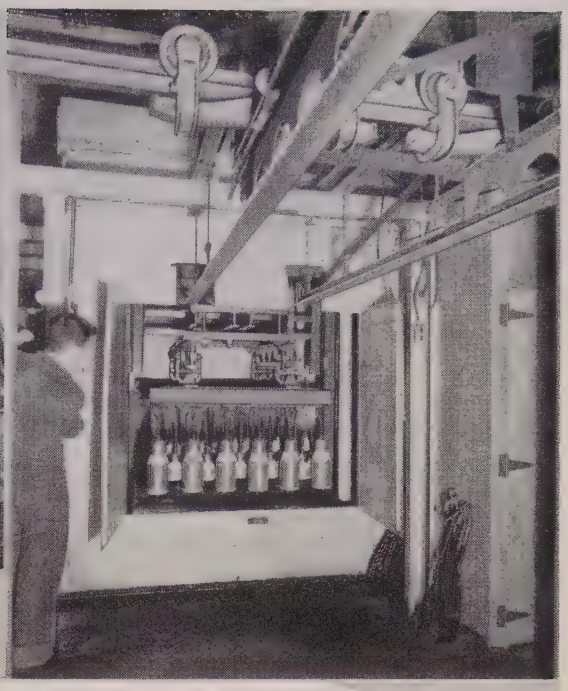
Unit is not designed for tiering or stacking operations, its principal function being confined to horizontal transportation. Platform is 96 inches long, 41 inches wide and 17½ inches high in lowered position, giving 6 inches of platform lift. Load platform nose is tapered to permit easy entry under skids. Pressure relief valve in the hydraulic lift system provides overload protection. Power steering for all eight wheels simplifies maneuvering in close quarters despite the truck's size.

Axle Assembly Adds Stability

USE REPLY CARD—CIRCLE No. 22

Axle assembly added to its Caravan line of four-wheel running gear is announced by United Mfg. Co., 19 W. Interstate St., Bedford, O. Greater stability is obtained by heavier overall construction incorporating 1¾-inch center arm stops. Called model 2-A, the axle also features maximum turning radius of 45 degrees, varying with track width and spring location. Capacity of 10,000 to 12,000 pounds for this automotive type assembly indicates application for handling air compressors, heavy-duty generators, pumps, tar kettles, etc. Design includes complete symmetry of steering arm to guard against eccentric loads; utilization of rounded stop boss to assure line





Tramrail rack carriers handle up to 72 armatures per load through the varnish dip tank, bake oven and cooling chamber.

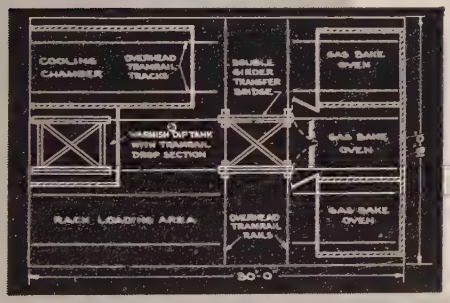
Rack loads of armatures are dipped into the varnish tank with the tramrail drop section.

EFFICIENCY AND CLEANLINESS INTRODUCED IN VARNISH INSULATING DEPARTMENT

The installation of a simple Cleveland Tramrail system in the varnish insulating department of D. W. Onan & Sons, Minneapolis, large manufacturers of electric generating plants, has made this one of the most compact and efficient departments of its kind. Complete insulation applications are given to the large production of armatures, stators and field coils in a space only 18 by 30 feet.

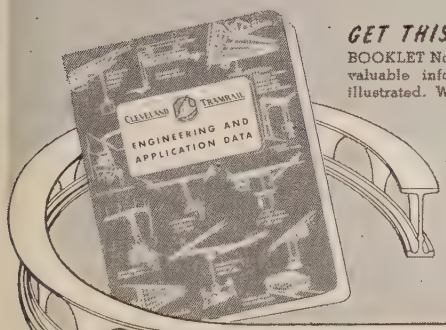
Prior to installation of the tramrail system, work in this department was hot, sticky and unpleasant. Workers had to wear long heavy gloves and protective aprons. After a time the floor racks, then used, would become coated with varnish several inches thick. Today the department is spic and span. The work is clean and easy. No hand handling is required until the varnish treatment is complete and the parts dry.

The tramrail system has eliminated a tremendous amount of rehandling and thereby saved time, speeded production and cut costs.



The rack carriers can be transferred by means of the double-girder transfer bridge to any of the six runways shown.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7819 East 284th St., Wickliffe, Ohio.



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Control Valves

No. 3401-R-4
½ Inch 4-Way
Foot Valve

FOOT OPERATED Air Valves

Increase output of hammers, shears, presses, etc.

● Operators have both hands free to handle the work—speeding production. Valving mechanism has stainless steel body and push-pull rods, brass sleeves, self-sealing U-packers and many other refinements, all fully enclosed against dirt, assuring long efficient trouble-free operation. Convenient pipe connections. No metal to metal seating. ⅜″ to 1″ sizes, 3-way and 4-way, neutral position and regular actions. *Write for full details.*

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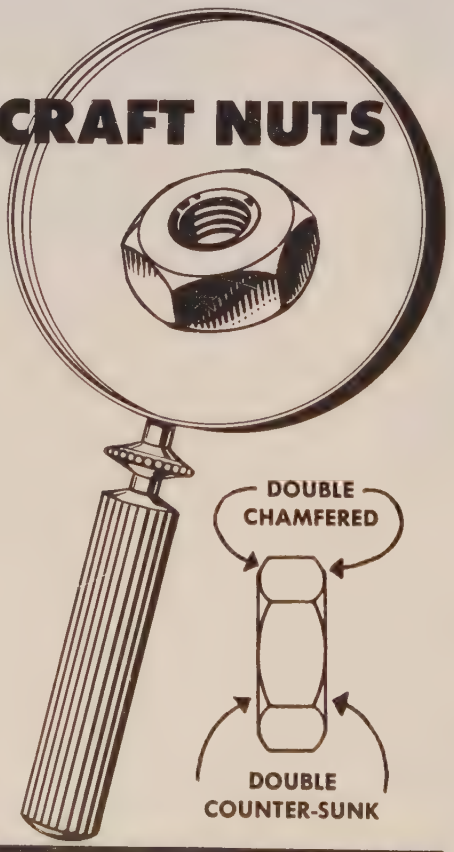
Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

Mfd. by C. B. HUNT & SON, INC., 1927 East Pershing St., Salem, Ohio

ATLAS AIRCRAFT NUTS

free of Burrs



Precision-made Atlas aircraft nuts are free of burrs . . . double chamfered, double counter-sunk, too. Manufactured to meet AN specifications, they are available in steel, brass and stainless.
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AT-118

ATLAS SCREW & SPECIALTY CORP.
450 BROOME STREET · NEW YORK 13, N. Y.

contact with axle stop; and incorporation of heavy flange on center arm to resist bending tendency when turn is stopped.

Forced Draft Gas Converter

USE REPLY CARD—CIRCLE No. 23

Model 214 forced draft conversion burner is announced by Bryant Industrial Division, Affiliated Gas Equipment Inc., 17825 St. Clair Ave., Cleveland 10, O. Burner is made in eleven capacities from 400,000 to 20,000,000 Btu input per hour. Equipment featured includes automatic electric ignition and electronic flame failure protection, constant air to gas ratio shutter, ceramic burner face and centrifugal blower type fan. Diaphragm valves are on-off or throttling-off type. Pilot operation is completely automatic with electric spark ignition. Pilot burner functions as both atmospheric and blast type unit and has provision for primary air adjustment.

Stainless-Steel Globe Valve

USE REPLY CARD—CIRCLE No. 24

A stainless steel welded constructed globe valve, offered by Hoppe Engineering Co., Greensboro, Ind., is for use with poison liquids and gases. Packing gland bolts are eliminated. Valves are available with bolted or welded caps, screwed, flanged or socket weld ends.

Reduces Installation Time

USE REPLY CARD—CIRCLE No. 25

Square D Co., Detroit 11, Mich., introduces a new joint design in their Feed-in-Duct to reduce installation time. Matching of left to right hand duct ends is unnecessary as all ends are identical in construction. Factory installed joint bolts face outward for accessibility. Only tie plates and nuts are needed to complete the joint.

Lubricant for Metal Cutting

USE REPLY CARD—CIRCLE No. 26

Cool-O-Lube, a lubricant-coolant, developed by Air Conversion Research Corp., Chicago 18, Ill., is applied by the Goodyear Pur-o-luber. It is said to lubricate and dissipate heat in all metal cutting operations. It has no odor, gives no smoke, is nonrancid and nonrusting.

Antifriction Bearings

USE REPLY CARD—CIRCLE No. 27

Tyson Bearing Corp., Massillon, O., announces addition of a new size range in their line of full roll-type tapered antifriction one, two and four-row bearings. Single row bear-

ings are available in sizes from 2 to 20 inches OD; two-row bearings from 4 to 20 inches OD and four-row bearings from 6 to 20 inches OD. These units are for use in rod, bar and strip mills, pinion stands, gear drives and other heavy metalworking machinery.

Pocket Bolt and Nut Gage

USE REPLY CARD—CIRCLE No. 28

Bolts and nuts are gaged quickly with the lightweight, pocket style bolt and nut gage available from Sorrell & Sons Co., Rocky River, O. Bolts are gaged by pushing them through the size holes and nuts by dropping them on the plugs on top edge of the gage. This also tells whether nut is coarse thread or fine thread.

Flush-Type Tip Dresser

USE REPLY CARD—CIRCLE No. 29

The flush-type electrode tip dresser, distributed by C. O. Porter Machinery Co., Grand Rapids, Mich., permits dressing of straight or tapered electrodes without removing them from the welder. It fits flush with the dressing tool or can be used with most power tools such as lathes, right angle drills and drill presses with ⅜-24 threaded extension.

Industrial Control Panels

USE REPLY CARD—CIRCLE No. 30

Pantro automatic load transfer control panels, made by Industrial Control Panel Co., Chicago 10, Ill., feature a close differential alternating current device that makes it impossible for load to operate on under voltage. Panels are built to the customer's specifications.

Grid Control Tube

USE REPLY CARD—CIRCLE No. 31

Mercury thyratron tube, developed by Sheldon Electric Co., Irvington, N. J., is capable of handling extremely high direct current voltages and current. Known as MT-1530, this grid control tube has a peak anode voltage of 15,000 v forward or inverse.

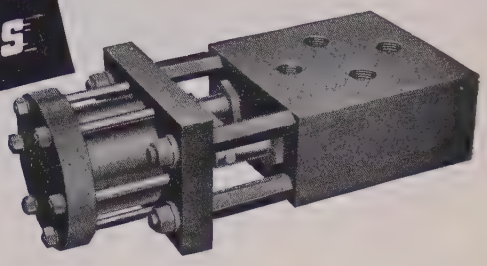
Eliminates Welding Scale

USE REPLY CARD—CIRCLE No. 32

SF (scale-free) welding coupling, made by Tube Turns Inc., Louisville 1, Ky., makes it possible to eliminate damaging welding scale from piping systems. It consists of two forged halves. The ends of the hubs are prepared for welding to pipe or welding fittings of corresponding sizes. When two halves of coupling are brought together, tongue of one slips

Quick-As-Wink AIR AND HYDRAULIC Control Valves

¾ Inch 4-Way — 5000 p.s.i. Piloted Hydraulic Valve



PILOT OPERATED Hydraulic Valve

For hydraulic systems to 5000 p.s.i.

● Designed for controlling double acting hydraulic cylinders. The pilot cylinder is controlled by any type of 4-way air valve and is operated either automatically or manually from a convenient control station. Machined steel housing, hard chrome plated ground and polished stainless steel plungers, molded packers sealed by valve pressure. All parts readily accessible without disturbing the piping. ½" to 4" sizes. *Write for full details.*

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Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

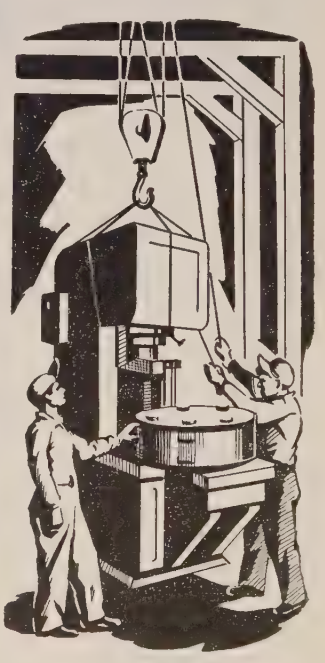
Mfd. by C. B. HUNT & SON, INC., 1924 East Pershing St., Salem, Ohio

When PRODUCTION hangs by a "Thread"...

specify the wire rope that gives the greatest service. "HERCULES" (Red-Strand) *Preformed* spools more evenly—bends more smoothly. Handles more safely. Splices more easily. Far fewer replacements are needed.

Engineered to reduce internal tension and twisting, "HERCULES" (Red-Strand) *Preformed* stays on the job—*in* the groove.

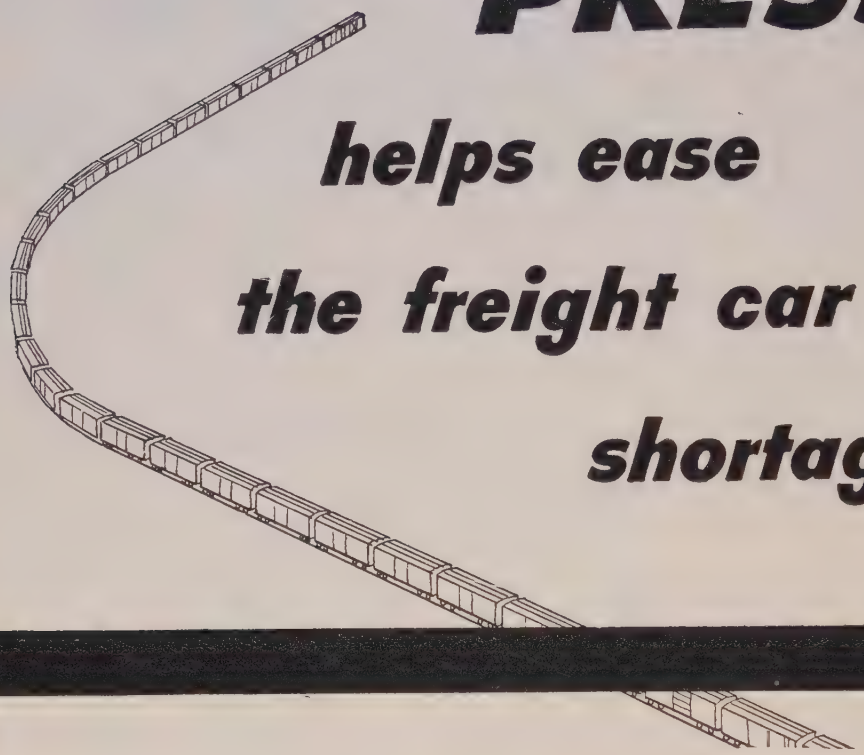
For uninterrupted production, there is only one right rope . . . be sure to select the correct size and type.



LESCHEN WIRE ROPE

Feel free to consult our Engineering Department at any time for specific recommendations. A. LESCHEN & SONS ROPE CO., 5909 Kennerly Avé., St. Louis, Missouri. Warehouses and branch offices in all principal cities.

This BALDWIN PRESS helps ease the freight car shortage



Aiming at higher production output to ease the freight-car shortage, this leading manufacturer recently installed a Baldwin Press. Reports indicate that this press is earning top honors as the most versatile, profitable and helpful piece of equipment in the shop.

Many manufacturers throughout the country have learned from experience how the features of Baldwin Presses pay out in greater output, fewer rejects, and all-round lower costs. The adjustable ram stroke and press pressure . . . the full-pressure capacity throughout the entire stroke . . . the positive overload protection . . . the automatic slow-down . . . the quick, simple die set-up . . . these are only a few of the many outstanding advantages that make Baldwin Hydraulic Presses economical production aids.

If you are thinking about installing a new press or replacing an old one, send for our bulletin 285. It gives a concise story on what Baldwin has to offer . . . a variety of presses for forming and drawing . . . forging . . . extrusion . . . plate work . . . and dozens of other miscellaneous applications. No matter what your press need, you'll find it profitable to talk to Baldwin.

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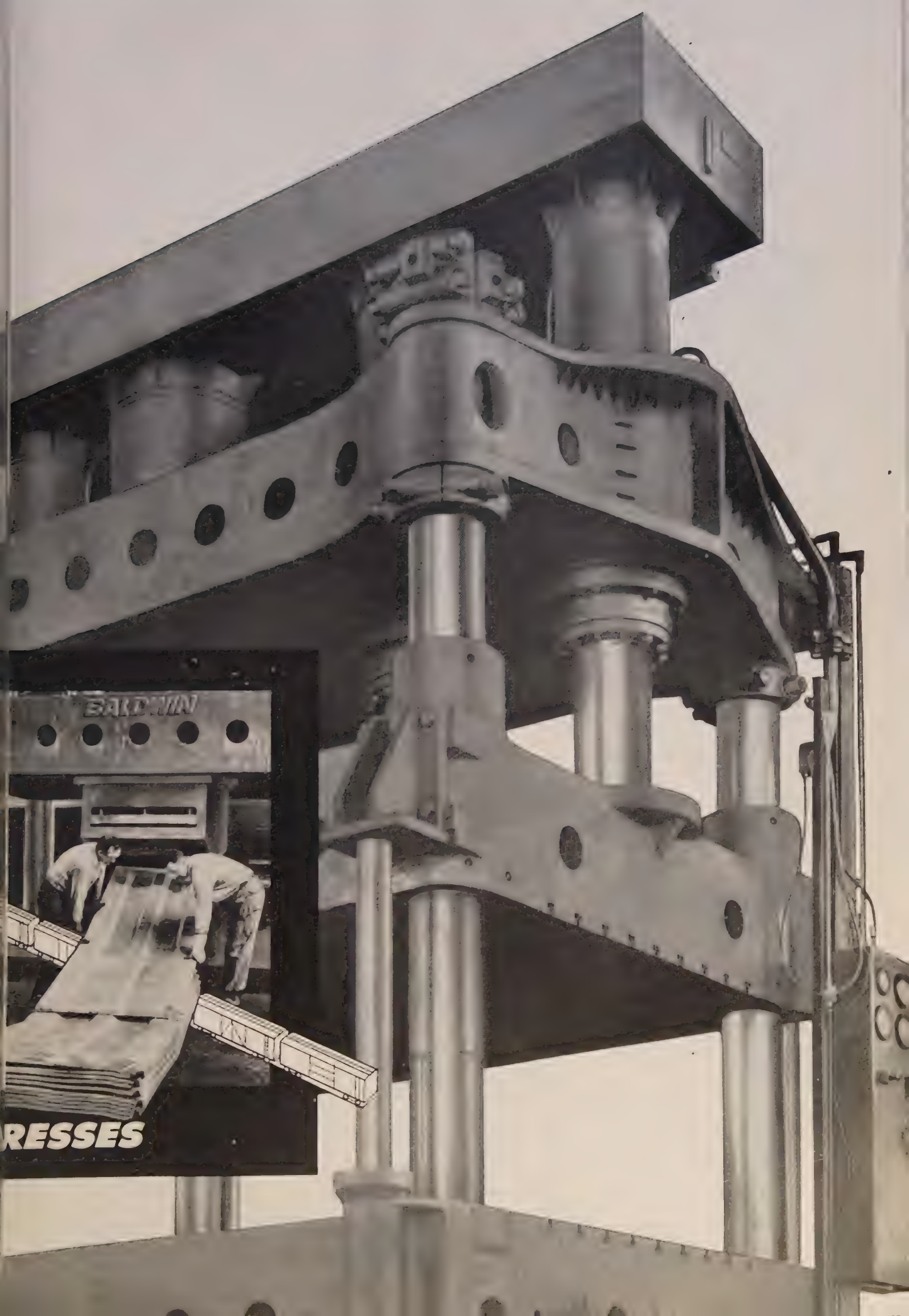

BALDWIN
RESSES

FOSTORIA INFRA-RED
Streamlines Production

FOR FINISH BAKING AND OTHER HEAT APPLICATIONS

Read these Results Typical of Thousands of FOSTORIA INFRA-RED INSTALLATIONS

EATON MFG. CO., Cleveland, Ohio, uses the 44 ft. 118 KW Fostoria oven, pictured above, to bake paint on auto heater parts. Mr. George Zidich, foreman of their subassembly dep't says: "The smoothness and efficiency of our entire operation depends upon our speedy Fostoria infra-red oven. We save drying time, and still get the kind of finish we want. Infra-red drying gives an even, longer lasting, tougher finish." Baking time on this completely conveyorized job is 3-2/10 minutes at 300°F.

Back of every Fostoria Infra-red oven recommendation are many years of intensive research — the foremost knowledge of Infra-red applications — the unequalled engineering skill and experience of many thousands of highly successful installations. Today, Fostoria Infra-red equipment is recognized as the highest efficiency standard of industry everywhere. Whatever your baking, drying, degreasing, or industrial heating problems may be, investigate now, the streamline efficiency and lower "per piece" production cost for your operations with Infra-red ovens as engineered by Fostoria.

SAVES SPACE

Fostoria Infra-red ovens operate on a comparatively short cycle which results in smaller oven requirements. They may also be suspended from ceiling mounts to eliminate floor space entirely.

SAVES TIME

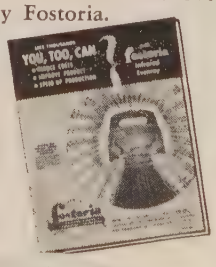
Reduces processing time from hours to minutes because of the inherent speed of Infra-red. There is no time lag in starting an oven, the heat is instantaneous.

SAVES MANPOWER— MANHOURS

Ideal for conveyorized production methods. Reduces excessive product handling. Turns out more pieces per day with ease, with less people.

CUTS COSTS

Faster production, lower operating costs, improved quality, result in lowest "per piece" cost.



GET THE FACTS ON FOSTORIA "KNOW HOW" HELP TO REDUCE YOUR "PER PIECE" PRODUCTION COST

Write, today, for this factual information on the Infra-red process and equipment as engineered by Fostoria. Technical data applicable to your operations will be included if you send us general facts about your particular problem. A Fostoria representative will gladly analyze your production needs and submit definite recommendations and carefully forecasted results for your consideration.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO
Oldest and Largest Manufacturers of Industrial Infra-red Ovens

INFRA-RED fostoria SYSTEM

into groove of the other. A circumferential cavity directly beneath the beveled welding area prevents burn-through or formation of icicles in the interior.

Grinding, Polishing Tool

USE REPLY CARD—CIRCLE No. 33

Cone-Loc drum sander, developed by American Diamond Saw Sales and distributed by Carborundum Co., Niagara Falls, N. Y., is a grinding and polishing tool that will never lose diameter. Abrasive strips are wrapped around the drum sander. When arbor nut is run up tight against locking cone washer, wheel becomes same as solid wheel.

Protection Against Corrosion

USE REPLY CARD—CIRCLE No. 34

BO 562, a water-white synthetic lacquer, developed by United Lacquer Mfg. Co., Linden, N. J., provides nonferrous metal objects with protection against corrosion. It offers high resistance to tarnishing caused by body acids, perspiration, alkalis and corrosive elements in the atmosphere.

Split-Flange Type Clamp

USE REPLY CARD—CIRCLE No. 35

Development of a split-flange type clamp is announced by Anchor Coupling Co. Inc., Libertyville, Ill. It eliminates threaded joints, prevents leaks and is easy to use. Device is available for use with either clamp or pressed-on type couplings in straight or angle styles for one or two-wire braid hose from ½ through 2 inches ID.

Redesigned Master Switch

USE REPLY CARD—CIRCLE No. 36

A redesigned master switch featuring a new cast-aluminum cover and up to five adjustable stops is announced by General Electric Co.'s Control Department, Schenectady 5, N. Y. For heavy duty installations, the dustproof unit is for application on large materials handling equipment such as steel mill type cranes. Adjustable stops provide for any combination of from one to five

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

points of movement of the operating handle in either clockwise or counter-clockwise direction.

High Velocity Air Filter

USE REPLY CARD—CIRCLE No. 37

Airsan Viro-Crimp, a high velocity air filter, is announced by Air Filter Corp., Milwaukee 2, Wis. It will operate at face velocities of 300 to 500 feet per hour at minimum resistance. The filter core is viscous type and constructed of horizontal layers of galvanized wire mesh arranged so that there is a large filter area with no appreciate pressure drop. Air flows into divided channels being baffled by a filter wall.

Bimetal Strip Thermostat

USE REPLY CARD—CIRCLE No. 38

Type C bimetal strip thermostat, offered by Stevens Mfg. Co. Inc., Mansfield, O., is used in conjunction with disk type thermostats for apparatus, communications and avionic equipment. Thermal element responds only to temperature changes in the controlled device or surrounding air, thus eliminating artificial cycling. Unit is available with operating ranges up to a maximum of 600° F.

Compact Voltage Regulator

USE REPLY CARD—CIRCLE No. 39

A more compact voltage regulator for small alternating current generators is announced by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. It is available in two ratings: Type V-00 with a 34-step commutator and type 221 with 50 steps. Its rocking contact design eliminates vibrating or sliding contacts. It is in motion only when change in excitation is required.

Chucks for Right Angle Lathes

USE REPLY CARD—CIRCLE No. 40

E. Horton & Son Co., Windsor Locks, Conn., offers a series of chucks designed for use on right angle lathes. It is now being made in a 36-inch diameter size which has a holding capacity from 12 to 36 inches. It is particularly adaptable for holding distorted pieces that have been stress in their "as is" position for machining.

USE A REPLY CARD

Just circle the corresponding number of any item in this section for more information.

WILLSON®
Heavy Duty
Cup Goggles
keep you on the safe side
WILLSON SAFETY GOGGLES
COMFORT FEATURES KEEP THEM IN USE
Molded Eye Cups Fit Facial Contours • Adjustable Bridge Width for Proper Fit • Side Screens Ventilated to Minimize Fogging • Adjustable Headband—Secure Fit Without Pressure • Fitted with Super-Tough® Hardened Glass or Plas-Tough* Plastic Lenses
OTHER WILLSON HEAVY DUTY GOGGLES
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Best way to find more scrap

Steel scrap—needed to keep the nation's mills rolling—grows scarcer every day.

Unless more scrap is found and turned in, steel users—and therefore the preparedness program—will suffer.

You manufacturers of steel products can do the most to improve the situation. And the best way, the proved way, is this: Use your *shoe leather*. Walk around your plant and property and keep your eyes peeled for every possible piece of iron and steel scrap.

Chances are you'll be surprised at the amount of old machinery and obsolete tools that can be recovered as scrap. Example: Simply by looking around, one West Coast plant recently turned up 120 carloads of scrap—over 3300 tons. That's money in the till!

So start using your shoe leather *now*. Help get in the scrap that will mean more steel for you!

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built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled shee alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-product For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

The Market Outlook

GOVERNMENT steel distribution policies are meeting growing criticism. With military requirements taking only a relatively small percentage of total output, less than 15 per cent, the Controlled Materials Plan is under increasing attack. Both producers and consumers of steel are displaying more annoyance over government regulations which, it is claimed, are contributing to shortages, hampering scheduling and production, and forcing manufacturing curtailments.

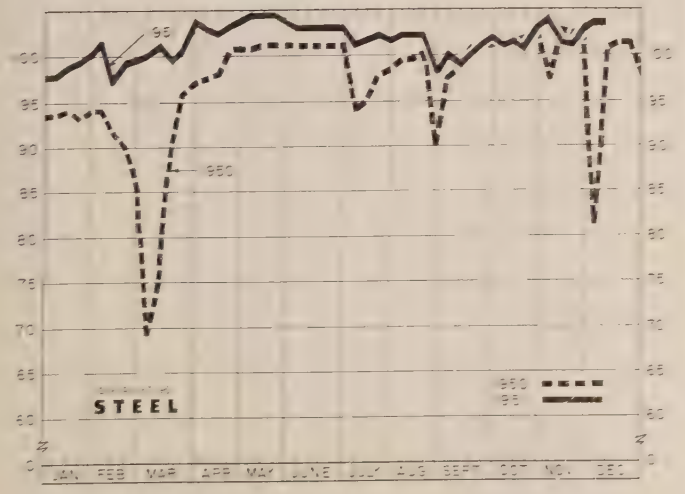
VIEWS— Some steelmakers are becoming more vocal in opposition to CMP. Others are not so critical. J. V. Honeycutt, assistant vice president, sales, Bethlehem Steel, told a Senate committee investigating the gray market, his company saw no reason for controls at this time, pointing out Bethlehem's order backlog has been falling since April and that by second quarter some of the company's facilities may not be in operation. He said if CMP were removed there would be no need for limitations on the amount of steel for civilian products. On the other hand, David Austin, executive vice president, U. S. Steel, said he had no quarrel with CMP or government controls, though he thought less restrictive means could be used to achieve the same ends. Generally, he feels CMP is accomplishing its true purpose; that steel is flowing where it should go quantitatively; that CMP is restrictive in those areas where the government wants it to be.

SHORTAGE— Majority opinion in the industry, it appears, favors limiting controls to military requirements, thus relinquishing the bulk of output for distribution without strings by the separate producers. Big debate in the market concerns the shortage that prevails. While it is conceded certain products are in acutely short supply, some trade authorities feel the overall steel scarcity is not actual in the truest sense of the word. They see the apparent shortage stemming from inflated demands resulting from overestimation of requirements by individual consumers under CMP, inept timing of shipments against needs, and inclusion of too broad a sweep of consuming industry in the defense-support category. It is estimated the steel take of so-called defense-support industries is running between 60 and 70 per cent of production, and it is argued that so long as steel is rationed on such a wide scale demand-supply relationships are bound to continue abnormal.

SURPLUS STEEL— Steel industry authorities, looking ahead, see surpluses on the way. Some think supply is catching up with demand with CMP distribution distorting the market picture. Before long, they fear, with larger production scheduled for 1952, the industry will be beating the bushes for orders. Currently, some excess tonnage is begging for buyers for the reason authorized CMP tickets are lacking to permit sales to prospective purchasers. David Austin of U. S. Steel thinks there will be a surplus of steel within five years at the rate steel capacity is being expanded. Whether current criticism will bring early relaxing of controls on production and distribution, however, is questionable. Government officials oppose a change at this time, in answer to critics of their distribution policy pointing out that though military needs are relatively small, the big problem of the moment is the caring for industrial expansion requirements on defense account.

PRODUCTION— Steel is pouring from a steadily increasing number of new facilities as the industry's expansion program begins to materialize. Substantial new ingot capacity has been placed in operation over recent weeks, especially at Pittsburgh and Cleveland, adding thousands of tons to the industry's production potential. Currently, facilities are being pushed to the limit of availability. Short scrap supply continues the chief threat to continued over-capacity operations through the winter, barring, of course, interruptions due to work stoppages stemming from failure to satisfactorily settle wage differences now in negotiation. Last week the national ingot rate was estimated at 103.5 per cent of capacity, unchanged from the preceding week. This was equivalent to output of about 2,070,000 net tons.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Dec. 8	Change	Same Week 1950	Same Week 1949
Pittsburgh	[illegible]	[illegible]*	98	92
Chicago	[illegible]	+ 1.5*	100	96.5
Mid-Atlantic	[illegible]	[illegible]	[illegible]	[illegible]
Youngstown	[illegible]	[illegible]	[illegible]	[illegible]
Wheeling	[illegible]	[illegible]	[illegible]	[illegible]
Cleveland	[illegible]	− 1*	[illegible]	[illegible]
Buffalo	[illegible]	[illegible]	[illegible]	[illegible]
Birmingham	[illegible]	− 1	[illegible]	[illegible]
New England	[illegible]	− 1	[illegible]	[illegible]
Cincinnati	[illegible]	[illegible]	[illegible]	[illegible]
St. Louis	[illegible]	[illegible]	[illegible]	[illegible]
Detroit	[illegible]	− 2.5	[illegible]	[illegible]
Western	[illegible]	− 2	[illegible]	[illegible]
Estimated national rate	[illegible]	[illegible]	[illegible]	[illegible]

Based on weekly steelmaking capacity of [illegible] tons for 1951, [illegible] tons for second half 1950, [illegible] tons for first half 1950, [illegible] tons for 1949.

* Change from revised rate for preceding week.

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Dec. 6 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)..	171.92	171.92	171.92	167.67	112.04
Index in cents per lb.	4.657	4.657	4.657	4.545	3.035

ARITHMETICAL PRICE COMPOSITES:

Finished Steel, NT	$106.32	$106.32	$106.32	$103.50	$64.73
No. 2 Fdry, Pig Iron, GT..	52.54	52.54	52.54	52.54	30.17
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	29.56
Malleable Pig Iron, GT ...	53.27	53.27	53.27	53.27	30.79
Steelmaking Scrap, GT	43.00	43.00	43.00	45.50	24.25

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Dec. 6 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.50
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	4.18	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.10
Shapes, Std., Pittsburgh...	3.65	3.65	3.65	3.65	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.35
Shapes, del. Philadelphia...	3.918	3.918	3.918	3.90	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.50
Plates, Chicago	3.70	3.70	3.70	3.70	2.50
Plates, Coatesville, Pa. ...	4.15	4.15	4.15	4.15	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.50
Sheets, H.R., Pittsburgh...	3.60–75	3.60–75	3.60–75	3.60–75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh...	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.41
Sheets, Galv., Pittsburgh...	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh.....	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.25	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.50-4.90	3.20
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.60	3.385
Wire, Basic, Pittsburgh ...	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.05
Nails, Wire, Pittsburgh ...	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	3.75
Tin plate, box, Pittsburgh..	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts.(NT)	$66.00	$66.00	$66.00	$66.00	$47.00
Wire rods, $\frac{7}{32}$-$\frac{3}{8}$", Pitts....	4.10–30	4.10–30	4.10–30	4.10–30	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$31.00
Basic Valley	52.00	52.00	52.00	52.00	30.00
Basic, del. Phila.	56.61	56.61	56.61	56.39	31.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Valley	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Del. Phila....	57.11	57.11	57.11	56.89	32.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	48.88	26.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	55.58	30.94
Malleable Valley	52.50	52.50	52.50	52.50	30.50
Malleable, Chicago	52.50	52.50	52.50	52.50	30.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	37.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt. Pitts. ..	$44.00	$44.00	$44.00	$46.50	$25.00
No. 1 Heavy Melt. E. Pa...	42.50	42.50	42.50	45.00	24.00
No. 1 Heavy Melt. Chicago.	42.50	42.50	42.50	45.00	25.00
No. 1 Heavy Melt. Valley..	44.00	44.00	44.00	46.25	25.00
No. 1 Heavy Melt. Cleve...	43.00	43.00	43.00	45.75	24.50
No. 1 Heavy Melt. Buffalo	43.00	43.00	43.00	49.88	24.25
Rails, Rerolling, Chicago..	52.50	52.50	52.50	67.00	27.25
No. 1 Cast, Chicago.....	49.00*	49.00*	49.00*	63.00	35.00*

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl. ..	$14.75	$14.75	$14.75	$14.75	$8.75
Beehive, Fdry., Connlsvl...	17.50	17.50	17.50	16.75	9.50
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	19.50
Zinc, E. St. Louis.....	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80	11.65
Tin, New York 103.00	103.00	103.00	142.00	70.00	
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex. ...	50.00	50.00	42.00	32.00	23.50
Nickel, refinery, duty paid.	56.50	56.50	56.50	50.50	38.50

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn,N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
AlabamaCity,Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward,Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda,N.Y. W12	52.00	52.50	53.00	....
No.Tonawanda,N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester,N.Y., del.	54.88	55.38	55.88	....
Syracuse,N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary,Ind. U5	52.00	....	52.50	....
IndianaHarbor,Ind. I-2	52.00	....	52.50	....
So.Chicago,Ill. W14	52.00	52.50	52.50	....
So.Chicago, Ill. Y1	52.00	52.50	52.50	....
So.Chicago,Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon,Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron,O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain,O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie,Pa. I-3	52.00	52.50	52.50	53.00
Everett,Mass. E1	....	57.00	57.50	....
Fontana,Calif. K1	58.00	58.50	....	....
Geneva,Utah G1	52.00	52.50	....	....
Seattle,Tacoma,Wash., del.	....	60.66	....	....
Portland,Oreg., del.	....	60.66	....	....
LosAngeles,SanFrancisco, del. ...	60.16	60.66	....	....
GraniteCity,Ill. G4	53.90	54.40	54.90	....
St.Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton,Utah C11	52.00	52.50	....	....
LoneStar,Tex. L6	48.00	*48.50	48.50	....
Minnequa,Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKeesRocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer,Pa. U5	52.00	....	52.50	53.00
Clairton,Rankin,So.Duquesne,Pa. U5	52.00	....	....	....
McKeesport,Pa. N3	52.00	....	....	53.00
Monessen,Pa. P7	54.00	....	....	....
Sharpsville,Pa. S6	....	....	52.50	53.00
Steelton,Pa. B2	54.00	54.50	55.00	55.50
Swedeland,Pa. A3	56.00	56.50	57.00	57.50
Toledo,O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy,N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard,O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield,O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

NiagaraFalls,N.Y. P15	$88.00*
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee,Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton,Pa. B2	60.00
Philadelphia delivered	63.37
Troy,N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Dec. 6, 1951; cents per pound except as otherwise noted. Changes shown in Italics. Code numbers following mill points indicate producing company; key on next two pages

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 .....52.00

INGOTS, Alloy (NT)
Detroit R7 .....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 .....62.00
Midland,Pa. C18 .....54.00
Munhall,Pa. U5 .....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 .....56.00
Ensley,Ala. T2 .....56.00
Fairfield,Ala. T2 .....56.00
Fontana,Calif. K1 .....75.00
Gary,Ind. U5 .....56.00
Johnstown,Pa. B2 .....56.00
Lackawanna,N.Y., B2..56.00
Munhall,Pa. U5 .....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ...56.00

Carbon, Forging (NT)
Bessemer, Pa. U5 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2 .....66.00
Clairton,Pa. U5 .....66.00
Cleveland R2 .....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 .....69.00
Ensley,Ala. T2 .....66.00
Fairfield,Ala. T2 .....66.00
Fontana,Calif. K1 .....85.00
Gary,Ind. U5 .....66.00
Geneva,Utah G1 .....66.00
Houston,Tex. S5 .....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....66.00
Seattle B3 .....85.00
So.Chicago R2,U5,W14 .66.00
So.Duquesne,Pa. U5 ...66.00
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 .....70.00
Canton,O. R2 .....70.00
Canton,O.(29) T7 .....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 .....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 .....70.00
Houston,Tex. S5 .....78.00
Ind.Harbor,Ind. Y1 ...70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 .....90.00
Massillon,O. R2 .....70.00
Midland,Pa. C18 .....70.00
Munhall,Pa. U5 .....70.00
So.Chicago R2,U5,W14. 70.00
So.Duquesne,Pa. U5 ...70.00
Struthers,O. Y1 .....70.00
Warren,O. C17 .....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$82.00
Cleveland R2 .....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 .....82.00
Massillon,O. R2 .....82.00
So.Chicago,Ill. R2 .....82.00
So.Duquesne,Pa. U5 ...82.00

SHEET BARS (NT)
Fontana,Calif. K1 ...$89.00

SKELP
Aliquippa,Pa. J5 .....$3.45
Munhall,Pa. U5 .....3.35
Warren,O. R2 .....3.35
Youngstown R2, U5 ....3.35

WIRE RODS
Alton,Ill. L1 .....4.40
AlabamaCity,Ala. R2 ...4.10
Buffalo W12 .....4.10
Cleveland A7 .....4.10
Donora,Pa. A7 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 .....4.90
Houston,Tex. S5 .....4.50
Johnstown,Pa. B2 .....4.10
Joliet,Ill. A7 .....4.10
LosAngeles B3 .....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 .....4.30
No.Tonawanda,N.Y. B11.4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 .....4.20
So.Chicago,Ill. R2 .....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 .....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ...4.45
Munhall,Pa. U5 .....4.45
So.Chicago,Ill. U5 .....4.45

STRUCTURALS
Carbon Steel Stand., Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 .....3.65
Bessemer,Ala. T2 .....3.65
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fairfield,Ala. T2 .....3.65
Fontana,Calif. K1 .....4.25
Gary,Ind. U5 .....3.65
Geneva,Utah G1 .....3.65
Houston,Tex. S5 .....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 .....3.65
Niles,Calif.(22) P1 .....4.85
Phoenixville,Pa. P4 .....5.90
Portland,Oreg. O4 .....4.50
Seattle B3 .....4.30
So.Chicago,Ill. U5, W14.3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 .....4.35
Fontana,Calif. K1 .....5.55
Munhall,Pa. U5 .....4.35
So.Chicago,Ill. U5 .....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.10
Gary,Ind. U5 .....5.50
Geneva,Utah G1 .....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y-1 ....6.00
Johnstown,Pa. B2 .....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 .....6.05
Munhall,Pa. U5 .....5.50
Seattle B3 .....6.10
So.Chicago,Ill. U5 .....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 .....6.00

Wide Flange
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fontana,Calif. K1 .....4.65
Lackawanna,N.Y. B2 ...3.70
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 .....5.45
So.Chicago,Ill. U5 .....5.45

BEARING PILES
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.65
Bessemer,Ala. T2 .....5.65
Clairton,Pa. U5 .....5.65
Cleveland J5, R2 .....5.65
Conshohocken,Pa. A3 ...5.90
Fairfield,Ala. T2 .....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 .....5.65
Geneva,Utah G1 .....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 .....5.65
Munhall,Pa. U5 .....5.65
Pittsburgh J5 .....5.65
Seattle B3 .....6.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5 .....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 .....5.65
Youngstown Y1 .....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ...5.05
Fontana,Calif. K1 .....5.70
Gary,Ind. U5 .....4.75
Johnstown,Pa. B2 .....4.75
Munhall,Pa. U5 .....4.75
Sharon,Pa. S3 .....5.20
So.Chicago,Ill. U5 .....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 .....4.75
Conshohocken,Pa. A3 ...4.75
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 .....4.75
So.Chicago,Ill. U5 .....4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ...3.95
Ashland,lcl(15) A10 ....4.45
Cleveland,c.l. R2 .....4.30
Warren,O.c.l. R2 .....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Ashland,Ky. (15) A10 ..3.70
Bessemer,Ala. T2 .....3.70
Clairton,Pa. U5 .....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 .....3.70
Coatesville,Pa. L7 .....4.15
Conshohocken,Pa. A3 ..4.15
Fairfield,Ala. T2 .....3.70
Fontana,Calif. (30) K1 .4.30
Gary,Ind. U5 .....3.70
GraniteCity,Ill. G4 .....4.40
Geneva,Utah G1 .....3.70
Harrisburg,Pa. C5 .....6.30
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 .....3.70
Pittsburgh J5 .....3.70
Seattle B3 .....4.60
Sharon,Pa. S3 .....3.95
So.Chicago,Ill. U5, W14.3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 .....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1.3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.45
Geneva,Utah G1 .....4.85

PLATES, Wrought Iron
Economy,Pa. B14 .....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Alton,Ill. L1 .....4.15
Atlanta,Ga. A11 .....4.25
Bessemer,Ala. T2 .....3.70
Buffalo R2 .....3.70
Canton,O. R2 .....3.70
Clairton,Pa. U5 .....3.70
Cleveland R2 .....3.70
Detroit R7 .....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
N.Tonawanda,N.Y. B11.3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
So.Chicago R2, U5, W14.3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ...4.45
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....3.70
Atlanta A11 .....4.25
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Niles,Calif. P1 .....5.05
Portland,Oreg. O4 .....4.65
SanFrancisco S7 .....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 .....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.30
Canton,O.(29) T7 .....3.95
Clairton,Pa. U5 .....4.30
Detroit R7 .....4.45
Ecorse,Mich. G5 .....4.65
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.30
Houston,Tex. S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.30
Midland,Pa. C18 .....4.30
So.Chicago R2, U5, W14.4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 .....4.30
Warren,O. C17 .....4.30
Youngstown U5 .....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....4.55
Gary,Ind. U5 .....4.55
Youngstown U5 .....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.55
Bessemer,Ala. T2 .....5.55
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.55
Cleveland R2 .....5.55
Fairfield,Ala. T2 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ..6.05
Johnstown,Pa. B2 .....5.55
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.25
Pittsburgh J5 .....5.55
Seattle B3 .....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 .....6.05
Youngstown U5 .....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2.4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 ....4.55
Detroit P17 .....4.70
Donora,Pa. A 7.....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 .....4.55
GreenBay,Wis. F7 .....4.55
Hammond,Ind. L2, M13 .4.55
Hartford,Conn. R2 .....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 .....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 .....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3 ..5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ...5.40
Bethlehem,Pa. B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.80
Canton,O. R2 .....5.40
Canton,O.(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 ..5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14.5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ...4.75
ChicagoHts.(3,4) I-2 ...4.75
Franklin,Pa. (3,4) F5 ..4.75
FortWorth,Tex.(26) T4..4.85
Huntngtn,W.Va.(3) W7 .5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda (3,4) B12 ..4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ..13.50
Dover,(Wrgh.Iron) U1..12.25
Economy,Pa. (S.R.) B14.9.60
Economy,Pa.(D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt) L5.14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ...13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.40
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.40
Monessen,Pa. P7 .....4.30
Niles,O. N12 .....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 .....3.60
Sharon,Pa. S3 .....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 .3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 .....3.60
Weirton,W.Va. W6 .....3.60
WestLeechburg,Pa. A4..3.75
Youngstown U5, Y1 ....3.60

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ..4.75
Dover,O. R1 .....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 .....5.65
Niles,O. N12 .....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R., (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....5.40
Conshohocken,Pa. A3 ..5.65
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.40
Fontana,Calif. K1 .....6.35
Gary,Ind. U5 .....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1..5.90
Irvin,Pa. U5 .....5.40
Lackawanna(35) B2 ...5.40
Pittsburgh J5 .....5.40
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. U5 .....5.40
SparrowsPoint (36) B2..5.40
Warren,O. R2 .....5.40
Weirton,W.Va. W6 .....5.75
Youngstown U5 .....5.40
Youngstown Y1 .....5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.55
Ecorse,Mich. G5 .....7.10
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.55
IndianaHarbor,Ind. Y1..7.05
IndianaHarbor,Ind. I-2..6.55
Irvin,Pa. U5 .....6.55
Lackawanna(37) B2 ...6.55
Pittsburgh J5 .....6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 .....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23)F4	6.85

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFy,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)

	0.25-lb	0.50 lb	0.75lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)

	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	....	....	....
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	....	....	....
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32)B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40)T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa.(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	....
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	....
Detroit D2	5.60	6.65	7.25	...	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	....	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	....
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base.	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Frtez-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.

J1 Jackson Iron & Steel Co
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)	S15 10.75
Carnegie,Pa.	S18 10.60
Cleveland	A7 10.00
Dover, O.	G6 10.50
Fontana,Calif.	K1 11.65
Harrison,N.J.	C18 10.60
Midland,Pa.	C18 10.60
NewBritn,Conn.(10)	S15 10.75
Pawtucket,R.I.(11)	N8.10.75
Pawtucket,R.I.(12)	N8.11.05
Sharon,Pa.	S3 10.60
Worcester,Mass.	A7 10.30
Youngstown	C8 10.60

STRIP, Hot-Rolled Ingot Iron

Asland,Ky. (8)	A10 3.75
Warren,O.	R2 4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O.	R2 5.25

TIGHT COOPERAGE HOOP

Atlanta	A11 4.05
Riverdale,Ill.	A1 3.90
Sharon,Pa.	S3 4.15
Youngstown	U5 3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity	R2. 5.70	5.95
Aliquippa	J5 5.70	6.15
Atlanta	A11 5.95	6.40
Bartonville(19)	K4 5.70	6.15
Buffalo	W12 4.85	...
Cleveland	A7 5.70	6.15
Crawfordsville	M8 5.95	6.40
Donora,Pa.	A7 5.70	6.15
Duluth,Minn.	A7. 5.70	6.15
Fairfield	T2 5.70	6.15
Houston,Tex.	S5 6.10	6.55
Johnstown	B2 5.70	6.15
Joliet,Ill.	A7 5.70	6.15
KansasCy,Mo.	S5. 6.30	6.75
Kokomo	C16 5.80	6.05
LosAngeles	B3 6.65	...
Minnequa	C10 5.95	4.45
Monessen	P7 5.95	6.40
Palmer	W12 5.15	...
Pitts.,Calif.	C11. 6.65	6.80
Prtsmth.(18)	P12 6.10	6.60
Rankin	A7 5.70	6.15
So.Chicago	R2 5.70	5.95
So.S.Fran.	C10 6.65	7.10
SparrowsPt.	B2 5.80	6.25
Sterling,Ill.(1)	N15 5.70	6.15
Struthers,O.	Y1 5.70	6.15
Torrance,Cal.	C11 6.65	...
Worcester	A7 6.00	6.45

ROPE WIRE

	(A)	(B)
Alton,Ill.	L1 8.65	8.90
Bartonville,Ill.	K4 8.55	8.80
Buffalo	W12 8.55	8.80
Fostoria,O.	S1 8.85	9.10
Johnstown,Pa.	B2 8.55	8.80
Monessen,Pa.	P16 8.55	8.80
Monessen,Pa.	P7. 8.80	9.05
Palmer,Mass.	W12 8.85	9.10
Portsmouth,O.	P12 8.55	8.80
Roebling,N.J.	R5. 8.85	9.10
SparrowsPt.	B2.. 8.65	8.90
Struthers,O.	Y1.. 8.55	8.80
Worcester	J4, T6. 8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala.	R2...4.85
Aliquippa,Pa.	J5 4.85
Atlanta	A11 5.10
Alton,Ill.	L1 5.05
Bartonville,Ill.(1)	K4 4.85
Buffalo	W12 4.85
Chicago	W13 5.10
Cleveland	A7, C20 4.85
Crawfordsville,Ind.	M8 .5.10
Donora,Pa.	A7 4.85
Duluth,Minn.	A7 4.85
Fairfield,Ala.	T2 4.85
Fostoria,O.(24)	S1 5.35
Houston	S5 5.25
Johnstown,Pa.	B2 4.85
Joliet,Ill.	A7 4.85
KansasCity,Mo.	S5 5.45
Kokomo,Ind.	C16 4.95
LosAngeles	B3 5.80
Minnequa,Colo.	C10 5.10
Monessen,Pa.	P7 5.10
Newark,	6-8 ga. I-1 5.50
No.Tonawanda	B11 4.85
Palmer,Mass.	W12 5.15
Pittsburg,Calif.	C11 5.80
Portsmouth,O.	P12 5.25
Rankin,Pa.	A7 4.85
So.Chicago,Ill.	R2 4.85
So.SanFrancisco	C10. 5.80
SparrowsPoint,Md.	B2..4.95
Sterling,Ill.(1)	N15 4.85
Struthers,O.	Y1 4.85
Torrance,Calif.	C11 5.80
Waukegan,Ill.	A7 4.85
Worcester,Mass.	A7, T6.5.15

WIRE, Cold-Rolled Flat

Anderson,Ind.	G6 6.20
Buffalo	W12 6.35
Cleveland	A7 5.85
Crawfordsville,Ind.	M8..6.20
Detroit	D2 6.20
Dover,O.	G6 6.20
Fostoria,O.	S1 6.00
Kokomo,Ind.	C16 5.70
FranklinPark,Ill.	T6 ..6.20
Massillon,O.	R8 5.85
Monessen,Pa.	P16 5.85
Monessen,Pa.	P7 6.10
NewHaven,Conn.	D2 6.50
Pawtucket,R.I.(12)	N8..6.85
Trenton,N.J.	R5 6.15
Worcester,Mass.	A7 6.15
Worcester,Mass.	T6 6.50
Worcester,Mass.	W12 6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill.	K4 8.50
Monessen,Pa.	P16 8.50
Roebling,N.J.	R5 8.80
SparrowsPoint,Md.	B2 .8.60
Johnstown,Pa.	B2 8.50

WIRE, Tire Bead

Bartonville,Ill.(1)	K4..10.90
Monessen,Pa.	P16 11.40
Roebling,N.J.	R5 11.55

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa	J5 10.15	12.15
Bartonville(1)	K4 10.25	11.95
Cleveland	A7 ..10.25	12.15
Crawfrdsville	M8.10.30	12.00
Fostoria,O.	S1 ..10.40	13.00
Johnstown	B2 ..10.25	12.15
Kokomo	C16 ...10.25	11.95
Minnequa	C10 ..10.40	12.40
Palmer,Mass.	W12.10.25	12.15
Pitts.Cal.	C11 ..10.60	12.50
Prtsmth.(18)	P12.10.55	12.30
SparrowsPt.	B2..10.35	12.25
Waukegan	A7 ..10.25	12.15

WIRE, MB Spring High Carbon

Aliquippa,Pa.	J5 6.25
Alton,Ill.	L1 6.45
Bartonville,Ill(1)	K4 ..6.25
Buffalo	W12 6.25
Cleveland	A7 6.25
Donora,Pa.	A7 6.25
Duluth,Minn.	A7 6.25
Fostoria,O.	S1 6.25
Johnstown,Pa.	B2 6.25
LosAngeles	B3 7.20
Milbury,Mass.(12)	N6 .8.05
Monessen,Pa.	P7, P16 .6.25
Palmer,Mass.	W12 6.55
Pittsburg,Calif.	C11 7.20
Roebling,N.J.	R5 6.55
Portsmouth,O.	P12 6.25
So.Chicago,Ill	R2 6.25
So.SanFrancisco	C10 7.20
SparrowsPoint,Md.	B2 .6.35
Struthers,O.	Y1 6.25
Trenton,N.J.	A7 6.55
Waukegan,Ill.	A7 6.25
Worcester	A7, T6, W12.6.55
Worcester,Mass.	J4 6.75

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1)	K4 ..8.90
Buffalo	W12 8.90
Chicago	W13 8.90
Cleveland	A7 8.90
Crawfordsville,Ind.	M8..8.95
Fostoria,O.	S1 8.90
Johnstown,Pa.	B2 8.90
Kokomo,Ind.	C16 8.90
Monessen,Pa.	P16 8.90
Palmer,Mass.	W12 9.20
Portsmouth,O.	P12 8.90
Roebling,N.J.	R5 9.20
Waukegan,Ill.	A7 8.90
Worcester,Mass.	A7 T6.9.20

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	.137
Aliquippa,Pa. J5	.141
Atlanta A11	.144
Bartonville,Ill.(19) K4	.144
Crawfordsville,Ind. M8	.146
Donora,Pa. A7	.141
Duluth,Minn. A7	.141
Fairfield,Ala. T2	.141
Houston,Tex. S5	.149
Johnstown,Pa. B2	.141
Joliet,Ill. A7	.141
KansasCity,Mo. S5	.153
Kokomo,Ind. C16	.143
Minnequa,Colo. C10	.147
Monessen,Pa. P7	.146
Pittsburg,Calif. C11	.161
Portsmouth,O.(18) P12	.148
Rankin,Pa. A7	.141
So.Chicago,Ill. R2	.137
So.SanFran.,Calif. C10	.161
SparrowsPoint,Md. B2	.143
Sterling,Ill.(1) N15	.141

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	.123
Atlanta A11	.126
Bartonville,Ill.(19) K4	.123
Crawfordsville,Ind. M8	.132
Donora,Pa. A7	.123
Duluth,Minn. A7	.123
Fairfield,Ala. T2	.123
Joliet,Ill. A7	.123
KansasCity,Mo. S5	.135
Kokomo,Ind C16	.125
Minnequa,Colo. C10	.128
Pittsburg,Calif. C11	.147
So. Chicago,Ill R2	.123
So.SanFran.,Calif. C10	.147
SparrowsPoint,Md. B2	.125
Sterling,Ill.(1) N15	.123

WIRE, Upholstery Spring

Aliquippa,Pa.	J5 5.90
Alton,Ill.	L1 6.10
Buffalo	W12 5.90
Cleveland	A7 5.90
Donora,Pa.	A7 5.90
Duluth,Minn.	A7 5.90
Johnstown,Pa.	B2 5.90
LosAngeles	B3 6.85
Monessen,Pa.	P7, P16 .5.90
NewHaven,Conn.	A7 6.20
Palmer,Mass.	W12 6.20
Pittsburg,Calif.	C11 6.85
Portsmouth,O.	P12 5.90
Roebling,N.J.	R5 6.20
So.Chicago,Ill.	R2 5.90
So.SanFrancisco	C10 6.85
SparrowsPoint,Md.	B2..6.00
Torrance,Calif.	C11 6.85
Trenton,N.J.	A7 6.20
Waukegan,Ill.	A7 5.90
Worcester,Mass.	A7 6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala.	R2 ..127
Ala.City,Ala.,17-18ga.	R2 214
Aliquippa,Pa.9-14½ga.	J5 131
Atlanta	A11 134
Bartonville,Ill.(19)	K4 ..131
Crawfordsville,Ind.	M8 ..133
Donora,Pa.	A7 131
Duluth,Minn.	A7 131
Fairfield,Ala.	T2 131
Houston,Tex.	S5 139
Johnstown,Pa.	B2 131
Johnstown,17ga.,6"	B2 ..205
Johnstown,17ga.,4"	B2 ..208
Joliet,Ill.	A7 131
KansasCity,Mo.	S5 143
Kokomo,Ind.	C16 133
Minnequa,Colo.	C10 139
Monessen,Pa.	P7 136
Pittsburg,Calif.	C11 154
Portsmouth,O.(18)	P12 .138
Rankin,Pa.	A7 131
So.Chicago,Ill.	R2 127
Sterling,Ill.(1)	N15 131

FENCE POSTS

ChicagoHts.,Ill.	C2 140
Duluth,Minn.	A7 125
Franklin,Pa.	F5 140
Huntington,W.Va.	W7 .140
Johnstown,Pa.	B2 140
Marion,O.	P11 140
Minnequa,Colo.	C10 130
Moline,Ill.	R2 136
So.Chicago,Ill.	R2 140
Tonawanda,N.Y.	B12 .140
Williamsport,Pa.	S19 .150

TRACK BOLTS (20) Treated

KansasCity,Mo.	S5 9.85
Lebanon,Pa.(31)	B2 9.85
Minnequa,Colo.	C10 9.85
Pittsburgh	O3, P14 .9.85
Seattle	B3 10.35

NAILS & STAPLES, Stock

To dealers & mfgrs. (7)	Col.
AlabamaCity,Ala.	R2 ..118
Aliquippa,Pa.(13)	J5 ..118
Atlanta	A11 121
Bartonville,Ill.(19)	K4 ..118
Chicago,Ill.	W13 118
Cleveland	A9 125
Crawfordsville,Ind.	M8 .122
Donora,Pa.	A7 118
Duluth,Minn.	A7 118
Fairfield,Ala.	T2 118
Galveston,Tex.	D7 126
Houston,Tex.	S5 126
Johnstown,Pa.	B2 118
Joliet,Ill.	A7 118
KansasCity,Mo.	S5 130
Kokomo,Ind.	C16 120
Minnequa,Colo.	C10 123
Monessen,Pa.	P7 124
Pittsburg,Calif.	C11 137
Portsmouth,O.	P12 124
Rankin,Pa.	A7 118
So.Chicago,Ill.	R2 118
SparrowsPoint,Md.	B2 .120
Sterling,Ill.(1)	N15 118
Torrance,Calif.	C11 138
Worcester,Mass.	A7 124

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa.	A3 $7.35
Wheeling,W.Va.	W10 ..7.35

TIE PLATES

Fairfield,Ala.	T2 4.50
Gary,Ind.	U5 4.50
Ind.Harbor,Ind.	I-2 4.50
Lackawanna,N.Y.	B2 ..4.50
Minnequa,Colo.	C10 4.50
Pittsburg,Calif.	C11 4.65
Seattle	B3 4.65
Steelton,Pa.	B2 4.50
Torrance,Calif.	C11 4.65

JOINT BARS

Bessemer,Pa.	U5 4.70
Fairfield,Ala.	T2 4.70
Ind.Harbor,Ind.	I-2 4.70
Joliet,Ill.	U5 4.70
Lackawanna,N.Y.	B2 .4.70
Minnequa,Colo.	C10 4.70
Steelton,Pa.	B2 4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind.	I-2, Y1.6.15
KansasCity,Mo.	S5 6.40
Lebanon,Pa.	B2 6.15
Minnequa,Colo.	C10 6.15
Pittsburgh	J5 6.15
Seattle	B3 6.65
So.Chicago,Ill.	R2 6.15
Struthers,O.	Y1 6.15
Youngstown	R2 6.15

AXLES

Ind.Harbor,Ind.	S13 5.60
Johnstown,Pa.	B2 5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa.	U5 3.60	3.50	3.55	4.00
Ensley,Ala.	T2 3.60	3.50	...	4.00
Fairfield,Ala.	T2 ...	...	...	4.00
Gary,Ind.	U5 3.60	3.50	3.55	...
Huntington,W.Va.	W7 ...	...	...	5.00
Ind.Harbor,Ind.	I-2 3.60	3.50	3.55	...
Johnstown,Pa.	B2 ...	...	...(16)	4.00
Lackawanna,N.Y.	B2 3.60	3.50	...	4.00
Minnequa,Colo.	C10 3.60	3.50	...	4.50
Steelton,Pa.	B2 3.60	3.50	...	...
Williamsport,Pa.	S19 ...	...	...	4.75

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Anaylsis

W	Cr	V	Co	
18	4	1	....	1.505
18	4	2	....	1.650
20.25	4.25	1.6	12.25	3.535-3.675
19	4	2	7	2.460
18.25	4.25	1	4.75	2.125
18	4	2	9	2.445-2.45
13.5	4	3	....	1.6025

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, and V3.

Footnotes:

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared: add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb.,Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts, Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,Eaton Mfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel

T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

Check on its
Uniformity –
Economy –
Toughness –
20th Century
the persuasive abrasive
One of the world's largest producers of quality shot and grit—*Normalized—Cut-wire—Hard Iron
*Copyrighted Trade Name
THE CLEVELAND Metal Abrasive CO.
884 East 67th Street Cleveland 8, Ohio
Howell Works: Howell, Michigan

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	6.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.0	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	44.0	41.0	20.5	22.5	19.5
1½	27.5	2.78	42.5	41.5	41.5	21.5	20.0	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36½% on 3½", 4"; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜"; Following make ½" and larger: Lorain, O., N3; Youngstown K2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ¾", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
302	....	....	....	....	19.75	26.24–27.50	77.00
304	25.00	29.50	....	....	24.50	27.50–27.77	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	34.00	....	....	26.00	35.92–36.50	....
317	34.50	39.00	....	....	....	....	....
318	33.50	38.00	....	....	....	....	....
321	26.50	31.00–32.00	....	....	23.00	33.00	111.00
347	27.50	32.00	....	....	24.00	33.50–33.83	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.55	45.15	41.00	54.00	....	....	....
Inconel	41.23	54.18	....	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	15
9/16-in. & ⅝-in.	18.5
¾-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

	Reg.	Hvy.
H.P. & C.P. Square:		
½-in. & smaller	15	15
9/16-in. & ⅝-in.	12	6.5
¾-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
9/16-in. & ⅝-in.	16.5	6.5
¾-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
9/16-in. & ⅝-in.	23	17.5
¾-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
9/16-in. & ⅝-in.	29.5	22
¾-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
		Light
7/16-in. & smaller	....	35
½-in. to ⅝-in.	....	28.5
¾-in. to 1½-in.	....	26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants Structural ½-in., larger 7.85c 7/8-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Inches Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
	CARBON	
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Balt., Types 301-347 sheet, except 303 and 309 E2.

Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens	
Pure benzol	30.00-35.00
Toluol, one deg.	26.00-33.00
Industrial xylol	25.00-33.50
Per ton bulk, ovens	
Sulphate of ammonia	$32-$45
Cents per pound, ovens	
Phenol, 40 (carlots, non-returnable drums)	17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron	Cents
98+% Fe, carlots	17.00
Swedish, c.i.f. New York, in bags	8.85-9.95
Electrolytic Iron:	
Annealed, 99.5% Fe	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper:	
Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver, 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed:	
1000 lb and over	6.00
Less than 1000 lb	6.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum:	
99.9%, minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

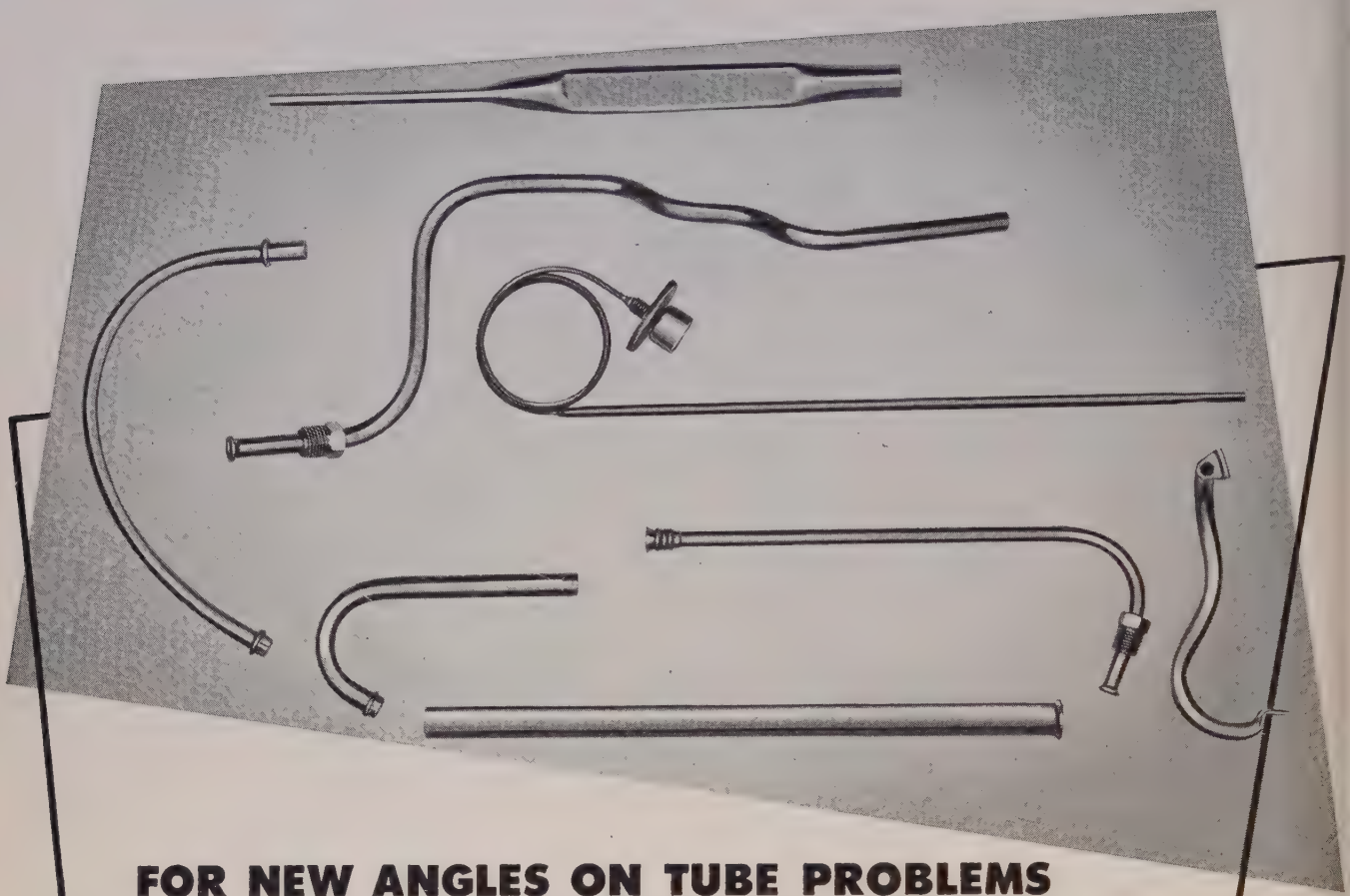
BEEHIVE OVENS

Connellsvll, fur.	$14.50-15.00
Connelsvll, fdry.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearny, N. J. ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Neville Island, Pa., ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.



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MORE FATIGUE RESISTANT

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HI-PRESSURE TESTED

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No matter how tough your steel tube problem—or what new production angles arise, we believe we can be of service to you. You'll find us equipped to produce the finest quality thin-wall tubing—and fabricate to desired forms and specifications. Highly satisfactory price advantages, plus startling performance records experienced by our growing list of users, offer convincing evidence of the superiority of FUSIONWELD steel tubing. And if you have special fabricating problems such as sharp angle bends, flaring, swaging, beading, sealing or expanding . . . with a need for complete absence of deformity, checks, splits or tears . . . FUSIONWELD has the answer.

You will likewise discover that Avon provides far greater fatigue resistance, coupled with hi-pressure hydraulic and pneumatic specifications to guarantee top quality performance.

We welcome the opportunity of submitting samples and figuring on your tube fabricating projections.

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"The Tubing With a Future"

AVON TUBE DIVISION

HIGBIE MFG. COMPANY • ROCHESTER, MICHIGAN

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city) ..	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try).	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city) ..	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)..	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city) ...	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try) ..	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va. ..	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va..	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse).	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)..	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††[5]	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††[5]	5.80	6.05	7.35
Pitts. (w'hse)..	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.82
Cleve. (w'hse).	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)..	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city).	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwau. (city).	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse).	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city).	5.75	6.55	6.90[2]	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75[2]	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05[3]	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse).	6.35	7.90	8.85[3]	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
Seattle-Tacoma.	6.65	7.80[4]	8.90[3]	6.60	...	6.45	8.20	...	6.45	6.50	8.60
San Francisco..	7.05	8.60[3]	9.20[3]	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [4]—3500 lb and over; [5]—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports. After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.6c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156.20.

High-Heat Duty: Salina, Pa., $99.60, Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensville, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hil, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76; Ottawa, Ill., $70.

Ladle Brick

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., $66.

Wire Cut: Chester, Wellsville, O., $64.

Malleable Bung Brick

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

Basic Brick

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73-$78; chemical-bonded chrome brick, $77-$82; magnesite brick, $99-$104; chemical-bonded magnesite, $88-$93.

Magnesite

Per net ton. Chewelah, Wash., Luning, Nev. Domestic dead-burned, ⅜" grains; bulk, $36.30; single paper bags, $41.80.

Dolomite

Per net ton. Domestic burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Clay Center, Woodville, Gibsonburg, O., Billmeyer, Plymouth Meeting, Blue Bell, Williams, Pa., Millville, W. Va., $13; Narlo and Bettsville, O., $13.75.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 10.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.55c, less ton 13.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 11.15c, per lb of briquet, c.l. packed 11.95c, ton lot 12.75c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

NOTE: For curent quotations on manganese, titanium and "other" ferroalloys, see page 139, Nov. 26 issue; for chromium, silicon, vanadium, boron, tungsten alloys, page 173 Dec. 3 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Oct. 23, 1951

STEELMAKING SCRAP COMPOSITE

Dec. 6	$43.00
Nov. 29	43.00
Nov. 1951	43.00
Dec. 1950	45.50
Dec. 1946	27.69

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	Grade 1 No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades	
2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Boring & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00
Elec. Furnace and Fdry. Grades	
11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free turnings	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00
30. Hard Steel cut 2 ft & under	+ 5.00
31. Old Tin & Terne Plated Bundles	—10.00
Unprepared Grades	
When compressed constitutes:	
32. No. 1 Bundles	— 6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.
(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.
(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.
(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.
(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.
(6) Prices for Grade 30 may be charged ony when sold to a gray iron foundry; otherwise price for Grade 20 will prevail.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats.	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, Switches.	Base
10. Flues, Tubes & Pipes.	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under.	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00
36. Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.
(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.
(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1.)

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:	
1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable).	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes.	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery.	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.
(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3. For preparing into:
(4) Grade No. 25, $6.
(5) Grade No. 19, $6.
(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) Grade No. 17 or No. 21, $11.
(8) Grade No. 18, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:
(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
For preparing into:
(3) Grade No. 16, $4.
(4) Grade No. 17, $5.
(5) Grade No. 18, $7.
(6) Grade No. 21, $4.
(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:
(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

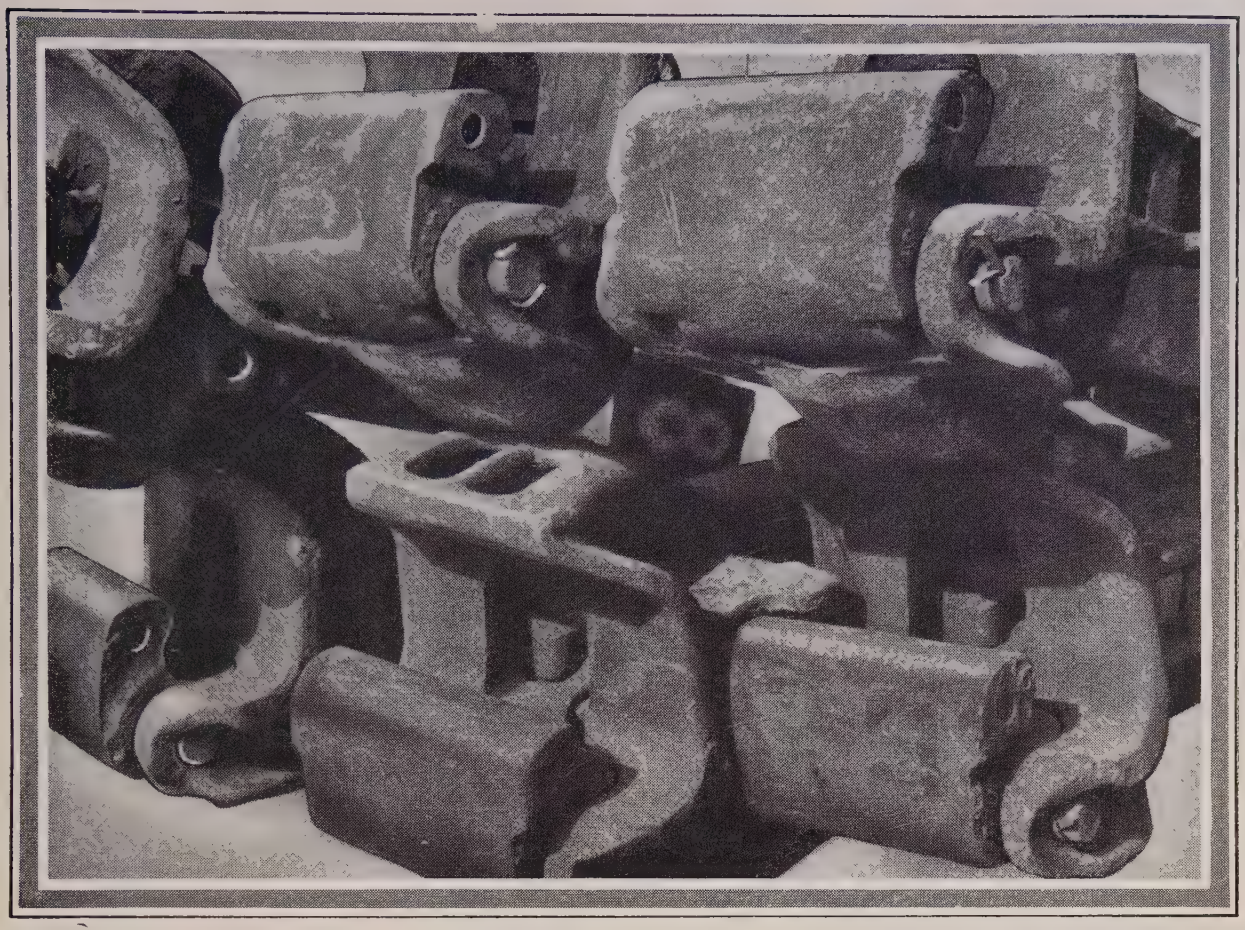
Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:
Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portand, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, 76c.
Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory:	
Prep'd.	33.00
Unprep'd.	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	55.00

* F.o.b. shipping point.



couplers and knuckles

use:

Couplers and Knuckles are a premium grade of cast steel scrap for the Electric Furnace and Acid Open Hearth because the phosphorus and sulphur content of this scrap is very low. Therefore, Couplers and Knuckles can be depended on for even chemical analysis.

source:

Obtained from scrapped railroad cars and equipment.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

specifications:

Couplers and knuckles. Railroad car and/or locomotive steel couplers, knuckles and/or locks stripped clean of all other attachments.

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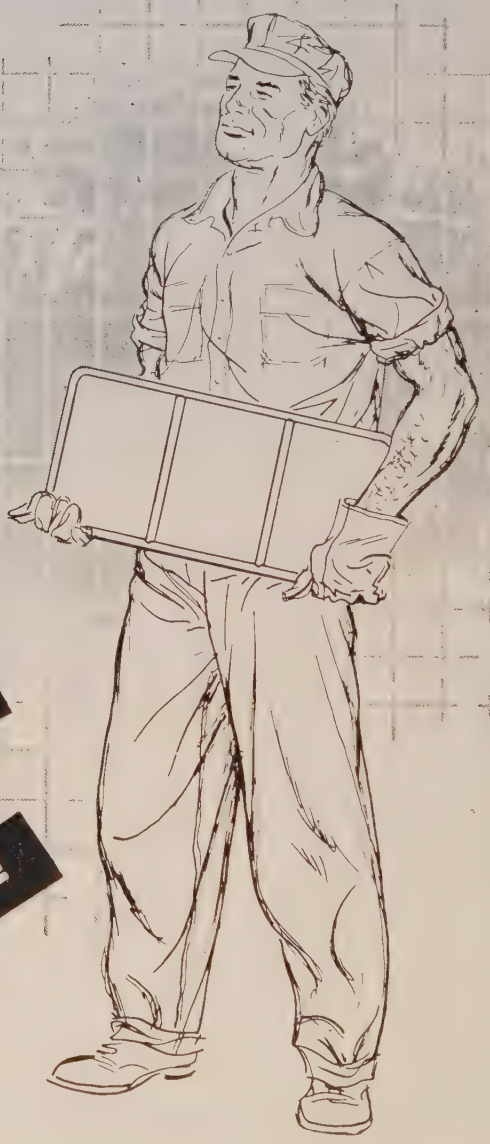

AMERICAN ZINC SALES COMPANY

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AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

Severest pinch in copper supplies expected to be felt in 1952 since expansion in production cannot keep pace with $1 billion increase in military programs

AVAILABILITY of copper is an increasingly important factor in setting up production goals in both military and civilian goods programs. The amount of copper that will be available in the first quarter for the production of automobiles, for instance, will determine the operating rate for that industry.

Supply of steel and other critical materials would permit a somewhat higher production schedule. With military production increasing $1 billion a month the pinch in civilian production will come in 1952.

Copper producers admit there is a shortage now, but take exception to what they describe as efforts by the government to bring about the substitution of other materials for copper on the assumption that the copper shortage will be permanent.

STEEL'S Metal Price Averages for Nov., 1951

(Cents per pound)

Electrolytic Copper, del Conn.	24.500
Lead, St. Louis	18.800
Prime, Western Zinc, E. St. Louis	19.500
Straits Tin, New York	103.00
Primary Aluminum ingots, del.	19.000
Antimony, f.o.b. Laredo, Tex.	44.560
Nickel, f.o.b. refinery	56.500
Silver, New York	88.000

The industry believes there will be a moderate increase in copper production in 1952 and that thereafter additions will be substantial. Supply of new copper in 1952 is estimated at about 1.5 million tons, providing none of it is diverted to the stockpile, compared with an estimated total of 1,350,000 tons this year and 1,636,295 tons in 1943, the record year. By mid-1953, there will be an additional 200,000 tons of new copper coming on the world's markets; by 1954-55, 350,000 tons.

Monthly copper output in 1955 is expected to be around 110,000 tons to 115,000 tons in the United States and 133,000 tons abroad. This estimate does not take into consideration possible higher production from scrap which is abnormally low at present.

National Production Authority estimates United States copper supply for 1951 at 1,609,000 tons compared with 1,747,000 tons in 1950. This agency's breakdown of its 1951 estimate is: Production of refined copper, 933,000 tons from primary sources, 133,000 tons from scrap, 259,000 tons from foreign ores; imports of metal, 229,000 tons; withdrawals from stockpile, 55,000 tons. Domestic primary copper production for 1951 is estimated at 1,005,000 tons.

Defense Materials Procurement Agency signed an agreement with American Smelting & Refining Co. underwriting new production of 197 million pounds over a 5½-year period. The company will expand its Silver Bell mine facilities, located in Pima county, Arizona, with a $17 million development. Annual production is expected to be around 36,260,000 pounds. The government will take up to 177 million pounds out of the first 197 milion pounds produced, if the company is unable to sell it at the guaranteed price, which will be 24.50c a pound, f.o.b. Connecticut Valley. Production will get under way within two years.

Plans Metal Conservation

Several proposals are being studied for the conservation of strategic metals, particularly copper. One order would prohibit the use of copper, except in current-carrying parts and with other minor exceptions, in any lighting fixtures other than marine and airport fixtures.

First quarter 1952 allotments of critical materials to the lighting industries amount to 90 per cent of stated requirements for military orders and a varying percentage for nonmilitary orders, based on usage in the year immediately preceding the outbreak of the Korean hostilities. For floodlighting, this ranged from 46 per cent of screened requirements of alloy steel to 75 per cent of copper foundry products; for street lighting, from 57 per cent of aluminum to 87 per cent of copper foundry products.

Rivet producers propose use of zinc-plated steel instead of copper-base alloys and aluminum in the production of tubular and split rivets for attaching linings to brakes and facings to clutches. Several hundreds of tons of copper base alloy and an undetermined amount of aluminum could be saved annually under the suggested conservation measure. Rivet manufacturers have not been successful in placing all of their CMP "tickets" for nonferrous metals.

U. S. Needs More Columbium

In spite of the government's strenuous efforts, we are importing only a fraction of the amount of columbium we will need if we build up to full scale production of jet engines of present design. This rare metal is one of the alloying metals that enable steel walls of a jet engine to withstand the terrific heat of burning gases. It has been found in paying quantities only in Nigeria and the Belgian Congo. Production in the Nigerian mines is being pushed and imports from the Belgian Congo are increasing, although with disappointing slowness. Small amounts are coming also from Brazil. There are reports of discoveries of columbite-tantalite ore in French Morocco.

SLOW FLOWING COLUMBITE
. . . but the need is large for jets

NPA May Cut Tube Inventories

Restrictions may be placed on inventories of collapsible tubes held by users. A proposed amendment to order M-27 would limit users' inventories to a 60-day supply of each size and type of tube. As an aid to small users, the amendment would permit inventories of 500 gross of each size and type of tube.

Aluminum Fabricator Renamed

Dominion Foils (Canada) Ltd., Hamilton, Ont., changed its name to Aluminum Rolling Mills Ltd. J. E. Simard, president, says the new name was adopted as more descriptive of the company's expanded mill operation which for some years has included the casting, rolling and processing of aluminum.

Plans Tennessee Smelter

Chromium Mining & Smelting Corp. Ltd., Montreal, expects to have a $1 million two-furnace smelter in operation near Memphis, Tenn., by the end of the year. The plant will be operated by Montana Ferroalloys Inc.

Offers Japanese Metals

Arrangements are being made by Loyal R. Milburn, consulting engineer, Detroit, to import titanium, tantalum, thorium, columbium, selenium, cadmium and bismuth from Japan. His source of these elements will be Toabussankaisha Ltd., Tokyo.

Will Remelt Aluminum Scrap

Superior Industries Inc., Youngstown, is building a small addition to its plant which will enable it to remelt its own aluminum scrap into billets.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c, East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99-99.8% and over but not meeting specifications below 50.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 50.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $215-$218 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.50 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18%, 53.14; phosphor-bronze grade A, 5%, 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95%, 41.30; 90% 40.82; red brass 85%, 39.83; 80%, 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90%, 43.79; red brass, 85%, 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95%, 41.90; 90%, 41.42; red brass, 85%, 40.43; 80%, 39.96; best quality brass, 39.44.
(Base prices, effective Nov. 6, 1950)

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.42; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 29.60-30.60, l.c.l. 30.10-31.10, 100,000 lb lots 29.35-30.35; magnet, del., 15,000 lb or more 34.50c, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	——Hexagonal—— 17S-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets, 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50-26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c, 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0009; more than 2000 lb, 98.09c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50, high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Dec. 1-6	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. 21-30	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. 1-20	24.50	18.80	19.50	103.00	19.00	42.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.56	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	50.50	90.16

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

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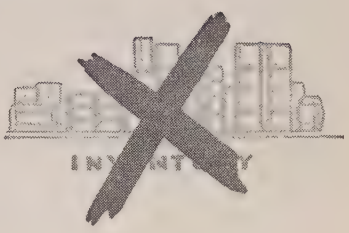
SOLVES YOUR INVENTORY PROBLEM!

Inventory often is too little and too late or too much and too soon. It ties up money needed for operating expenses or it ties up the plant by lacking things it should supply.

There is a man in your locality who will finance your inventory. He has at all times approximately $500,000,000 invested in the tools, equipment and materials you need. He will gladly and promptly supply from his large local stocks many things which you frequently and urgently need. Why not get better acquainted with this man.



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There are approximately 2,000 Industrial Distributors serving every industrial section of the United States. In 1948 their total sales were more than $3,000,000,000. They carry an average inventory of $500,000,000, turn their stocks 5 to 6 times per year, fill 200,000 orders per day, have 12,000 outside salesmen and engineers, 10,000 inside telephone order expeditors, operate 8000 trucks delivering merchandise on which their average net profit is .0292 cents per dollar of sales.

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BRONZE BEARINGS
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THE BUNTING BRASS & BRONZE CO., TOLEDO 9, OHIO

Sheets, Strip . . .

Sheet and Strip Prices, Page 157 & 158

Cleveland — While most producers of sheets are sold out for first quarter consumer pressure for tonnage is noticeably off. One seller reports the number of office callers seeking to place orders has been shrinking steadily of late though some consumers are continuing to have difficulty in getting their CMP tickets honored for first quarter.

Easier tone is most noticeable in silicon sheets, slackening demand here reflecting cutbacks in electrical goods production attributable to shortages of copper and limitations on manufacture of civilian durable goods, such as home appliances using motors.

Producers have not yet opened books for second quarter except for highly-rated defense business. Indications are opening will be deferred until the last minute with the outlook for supply still clouded in uncertainty. Producers of light, flat-rolled items do not know how much additional continuous mill rolling time will have to be devoted to light plate production. With heavy plates in extremely tight supply expectations are a substantial portion of the light plate burden will be transferred from the standard plate mills to the continuous mills shortly. This will cut sheet supply sharply, in all likelihood more than offsetting any slack in demand arising from curtailment in civilian durable goods manufacture.

Boston — Decline in specifications for flat-rolled steel for first quarter is only partially due to slackening in orders for consumer durable goods. Reduction in authorized CMP tickets also is a contributing factor. More fabricators, notably stamping shops, are interested in subcontracts. While considerable subcontracting is being done for aircraft, the peak of subletting appears to be some months ahead. Mills are offering more spot sheet tonnage frequently, including excess rollings and wasters. This volume is at times somewhat slow to move due to lack of authorizations. Nonintegrated mills are reducing backlogs and improving deliveries. Some still have openings in schedules for late first quarter.

Philadelphia—With volume for finished consumer durable goods off sheet users are slower to take full advantage of first quarter allotments, notably appliance manufacturers. Slack in new volume is not balanced by defense contracts, except in scattered cases.

Pittsburgh — Carbon sheet books are filled for first quarter. No second quarter bookings have been made up to this time. Mills expect some reduction in second quarter production when more rolling time will be opened-up on continuous strip mills for lighter gage plates. Electrical sheets remain in excellent supply and long ternes can be moved but require some sales effort to outlets other than those considered normal. Hot and cold-rolled are in greatest demand. Many producers are turning to long ternes in place of galvanized material which is in good demand.

Cincinnati — Mills rolling light plates are being pushed for maximum output, against demand which appears more urgent than for lighter products. Heavier pressure is developing for high silicon electrical sheets.

Chicago — Reduced demand for sheets in the automobile industry is expected to be reflected in this market eventually but up to the moment there has been no easing in demand. Mills report first quarter hot rolled capacity fully occupied.

It appears the automotive industry has lost its interest in conversion steel and will make no new deals for the future. It is expected, however, that they will go through with all present commitments. Companies rolling conversion steel indicate their capacity is fully committed. It is expected there may be considerable switching from sheets to bars.

Birmingham — Slight lessening in demand for sheets is noted. Net result relieves the pressure on the mills somewhat though there is not even an approximate balance between overall supply and demand in this territory.

Stainless Steel . . .

Stainless Steel Prices Page 161

Welland, Ont.—Atlas Steels Ltd., principal Canadian producer of tool steels, plans to spend $6 million on a continuous hot and cold rolling strip mill and tube mill for its works here. The mills will produce stainless steel strip and welded stainless steel tubing.

In September, 1950, the company put into production a mill for hot rolling stainless sheets. The company is extending its operations by adding a cold rolling mill for the further processing of stainless steel. This unit is expected to be in operation by February, 1952.

Steel Bars . . .

Bar Prices, Page 157

Cleveland—Pressure on the bar mills is unrelieved and there is little chance for any improvement in supply conditions over coming months with defense requirements increasingly to the fore. Indications are there will be substantial order carryover into first quarter of next year. To what extent this will dislocate scheduling in that period is uncertain since some of the carryover will be offset by cutbacks on automotive and other consumer goods account. Forging bars are in increasingly strong demand.

Boston—Cold-drawn bar schedules on carbon grades are filling rapidly and some adjustments are likely when authorizations are complete. More inquiry for tonnage, including alloys, to apply against defense contracts is coming out. Small arms account for substantial volume.

Philadelphia—Carryover volume on carbon bars into first quarter will be substantial.

Pittsburgh—Demand for all sizes of bars continues unabated. Unplaced fourth quarter CMP tickets are in evidence but find no producer with rolling time available. Some mill books are open for second quarter. Some mills report a lessening in demand for the larger sizes during the last few weeks.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 157

Seattle — Demand for reinforcing bars is insistent. Heavy placements are scheduled for first quarter. Bethlehem Pacific Coast Steel Corp. booked 1000 tons for the third unit of Seattle's viaduct. Pending awards include 5000 tons for a Washington state bridge, 500 tons for a Boeing office building, and 550 tons for Lucky Peak dam.

Structural Shapes . . .

Structural Shape Prices, Page 157

Boston—Buyers of structural steel, in some cases, are seeking places in mill schedules before work drawings and plans for projects are completed. This attempt to get in earliest quarterly schedule possible is contributing to inflated demand for structurals. New tonnage coming out for estimates is off with fabricating shops competing more actively for contracts.

Philadelphia—Less fabricated structural work is up for estimates and mills are making some inroads against backlogs. Fabricating shops are operating below capacity because of inability to obtain sizes needed for smooth flow of work through shops.

Pittsburgh—Fabricators are clamoring for structurals but getting a deaf ear to their pleas. Many have had to curtail operations. Producing mills offer no hope of the picture changing for many months to come.

Cleveland—Allotting of additional first quarter tonnage for construction of schools and other public buildings by NPA will not change conditions in the structural trade to any marked extent. Added tonnage will permit some projects to go ahead but indications are it will be months before shape supply is sufficiently easier to permit active work on most of the jobs now proposed. Expectations are supply conditions will ease after mid-1952 by which time considerable industrial expansion on defense account should be out of the way.

Los Angeles—Trade observers, recently returned from the East Coast, report supply of structural shapes is relatively easier on the West Coast than in the east.

Seattle — Structural shape allotments to fabricators are inadequate and mill deliveries slow, conditions which make for caution in bidding on new jobs. Fabricating shops are operating close to capacity with order backlogs sufficient to carry them through first quarter. Bethlehem booked 1500 tons last week for projects at Portland, Oreg., and Seattle. Among tonnages pending are 1400 for the Palisades dam, Snake river, Idaho, and 600 for an office building at Portland for the Bonneville power administration.

Wire . . .

Wire Prices, Page 159

Boston—Integrated wire mills are hampered by shortages of semi-finished. Low scrap inventories are a factor. Producers are meeting converter rod allocations with increasing difficulty, sometimes at expense of

"no more GAMBLING on tool steel selection"

[⅓ actual size; Selector is in 3 colors]

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of *picking the right tool steel right from the start* is going over big.

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FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application--Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group — Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

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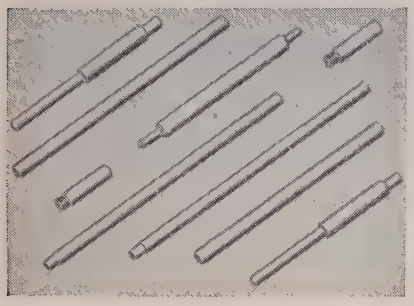

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their own rod requirements. Galvanized, tinned and copper-coated wire production is hampered by shortages of coating materials.

Birmingham—Unusually moderate weather has held demand for most wire products at high level. Some items in manufacturers wire, notably coil spring and the more popular items in nails are reported especially short.

Tubular Goods . . .

Tubular Goods Prices, Page 161

Washington—Tubing producers are seeking assistance of NPA in removing obstacles unbalancing production and distribution of welded and seamless tubing. Demands for seamless are overtaxing mill capacity, but there is an excess of capacity at welded tubing mills over controlled materials orders.

Producers point out that part of the difficulty in seamless tubing stems from insistence by military procurement officials on seamless tubing of high quality steels for purposes which, during World War II required only welded tubing.

Formation of an integrating committee to examine military orders for seamless tubing and suggest substitutions is proposed as one method to effect savings and relieve the burden on seamless tube producers.

NPA is making an effort to induce chemical, wine, dairy and other industries to switch from stainless steel pipe to glass tubing or light wall pipe sizes, wherever feasible as a means of conserving stainless.

Shortages of carbon bars for piercing has resulted in some facilities cutting down operations to as low as 70 per cent of normal capacity. This is reported particularly true of non-integrated tubing mills.

Boston — Shortages of galvanized and small sizes of seamless are expected to extend through second quarter. Some mills are making no allotments of galvanized for first quarter. Producers, in some instances, have opened books for second quarter on direct mill shipments.

Los Angeles—Fabricators are hampered by tight supplies of small diameter pipe. For example: with one pipe producer monthly dividing 40 tons of 4 in. diameter pipe between eight pipe users, one fabricator would require eight months to accumulate enough pipe to complete an average job.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 161

Cleveland—Cutbacks in automobile and other consumer goods are reflected in some slackening in demand for bolts, nuts and rivets. On the other hand, pressure for supplies on defense account is increasing. For example, requirements for large rivets for the railroad car program more than offset the slack in demand for smaller sizes on civilian goods account. Steel supplies are reported comfortable by some makers, but others are still having difficulty getting all the tonnage they require.

Los Angeles—Demand for nuts and bolts is sharply reduced. Mill delivery promises range from 1-30 days on most items.

Semifinished Steel . . .

Semifinished Prices, Page 157

Pittsburgh—First steel from the fourth of Jones & Laughlin's 11 new open-hearth furnaces was recently tapped at the company's Pittsburgh Works. Two more units are expected to be ready to make steel before the year's end. The remaining five furnaces are planned for completion by March.

The district's steel ingot rate last week was 100.93 per cent unchanged from the previous week's 101.02 per cent. This is seen as outstanding since Pittsburgh Steel's operations are only listed as 61.8 per cent due to seven of its 12 open-hearth furnaces being down for the next few weeks during changeover to a new blooming mill at Monessen, Pa.

Cleveland—District steelmaking operations are being pushed at above capacity pace. Last week the local ingot rate was estimated at 105 per cent of capacity. Jones & Laughlin Steel Corp. has placed two new open-hearths into production at its Otis Works. The furnaces, 225 tons capacity each, are expected to add 480,000 tons annually to the plant's capacity.

Plates . . .

Plate Prices, Page 157

Pittsburgh—Fabricators are hard pressed for material in this area. Producers see more production in first quarter when continuous hot strip mills will open-up rolling time for lighter gage plates. However, material will not be any easier to secure according to the mills.

Boston—For long-term work taking substantial tonnage, plate shops are slow to enter estimates due to uncertainty of obtaining steel to cover commitments. Tank builders confront reductions in allocations starting Jan. 1 when heads will be included in regular plate allotments.

Philadelphia—Enough supplemental tonnage has been released to enable shipyards to resume work on 15 Mariner class cargo ships at six yards shortly. Demand for plates continues heavy with large ratio of volume for defense.

Birmingham—Plate producers are as hard pressed as ever. Reports are some certified tonnage has had to be reshuffled. Warehouses hold limited stocks. Carbuilding continues at capacity. Miscellaneous use is heavy.

Seattle — Fabricators are greatly hampered by the plate shortage. Increased interest is shown in foreign steel although it is hard to get and commands premium prices. Largest job pending involves 6000 tons of steel sheet piling for a cofferdam at The Dalles, Oreg., a $10 million project on which bids to the U. S. Engineer, Portland, go in Jan. 22.

Iron Ore . . .

Iron Ore Prices, Page 163

Cleveland—Lake shipping is drawing to a close rapidly, indicating movement of about 89 million tons of iron ore for the season. This compares with 78,205,592 tons shipped in 1950 and 91,612,753 tons in 1942, the all-time high.

Shipments of Lake Superior iron

ore amounted to 941,559 tons for the week ended Dec. 3, making the cumulative total to that date 88,599,319 tons. It is estimated that probably not much more than 400,000 tons will be brought down over the balance of the season.

November shipments aggregated 5,695,281 tons compared with 11,089,455 tons in October and 6,993,233 tons in November, 1950.

The only upper lakes docks still operating are those of the Duluth, Missabe & Iron Range Railroad at Duluth and Two Harbors and the Chicago & Northwestern docks at Escanaba.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 161

Cleveland—Oven coke is in plentiful supply here. Slowing down of melting operations at light castings shops, due largely to cutbacks in consumer durable goods manufacture, has taken considerable pressure off suppliers. In fact, tonnage is available for prompt shipment with oven operators at some points actively seeking orders. Operations at some coke plants in other districts are reported on a curtailed basis for lack of business. Stocks in the hands of consumers are reported comfortable but with winter just ahead expectations are buyers will seek to maintain inventories at high levels in anticipation of slower deliveries from here on and possible pickup in castings requirements in first quarter as defense needs expand. The Erie ovens, down for extensive rebuilding for months past, are expected to come back into production about Feb. 1.

Pig Iron . . .

Pig Iron Prices, Page 156

Cleveland—Merchant pig iron sellers continue under pressure for tonnage in this district despite slackening in light castings production due to cutbacks in civilian durable goods. Pickup in demand from the heavy foundries appears to more than offset the slack from light castings, this being particularly noticeable here with respect to machine tool castings.

There is no excess iron available here with the two large local producers for the merchant market still in receipt of releases in excess of their production. However, reports are heard in the trade of some blast furnaces at other points piling iron. These reports are difficult to pin down, canvass of all the leading sellers here indicating they still have more tonnage on order than they can satisfy promptly.

One explanation is that some furnaces may be piling iron in preparation for repair shutdowns. Such stockpiling is normal practice since producers seek to be able to care for at least a portion of their customers' requirements during shutdown periods. Currently silveries and other special irons are in very short supply.

Outlook for first quarter is clouded in uncertainty. Expanding defense production holds the key to immediate future activities of the foundries with civilian goods manufacturing definitely headed for still slower pace due to government restrictions on metals consumption.

To what extent the light castings shops will participate in military and essential programs over coming months is anyone's guess. Hopes are high, however, castings requirements for defense will increase markedly from here on with military production reportedly gaining at a rate of $1 billion monthly. Meanwhile, producers of light castings are beating the bushes for business, in some cases offering price concessions.

Boston—Deferred contract shipments by some foundries permits small additions to district furnace stockpile and larger ratio of iron in melt with some consumers. Busiest shops are those producing for machine tool builders, but on the whole total melt has not increased materially.

Philadelphia—While foundry iron melt is below peak, limited shipments available operate against increasing inventory and consumers are taking in all tonnage offered. Furnaces are also operating with little or no reserve stocks. Foreign iron is available but consumers are reluctant to buy for second quarter at high prices.

Pittsburgh—Demand for iron continues strong. Castings for consumer products have fallen off in recent weeks which has helped take some of the pressure off merchant sellers. All the district's furnaces are operating with the exception of the No. 4 stack of U. S. Steel's Edgar Thompson Works. It will be out of blast until mid-January. An improvement program at Shenango Furnace Co.'s Sharpsville Works—to cost approximately $345,000—will increase iron output about 10 per cent.

Chicago—Pig iron supply is accommodating the needs of gray iron foundries whose melting rates are down considerably from reduced order volume for castings. There is no indication of tightening in the immediate period ahead.

Birmingham—Merchant iron furnaces are still far from being able to supply all comers. Inquiries from other than regular customers are numerous. General foundry operations remain brisk.

Seattle—Foundry operations here are reported above normal for this season. About half of current contracts for castings are on defense account.

Warehouse . . .

Warehouse Prices, Page 163

Cleveland—Price rollbacks of $1 to $2 per ton through the list of products are likely to result from the new OPS warehouse price regulation which becomes effective Dec. 16. In part the rollbacks will stem from individual warehouse adjustments of quotations to competitive levels established by district distributors with lower freight costs. In other words, freight costs are the determining factor in establishing district prices and, in general that warehouse with the

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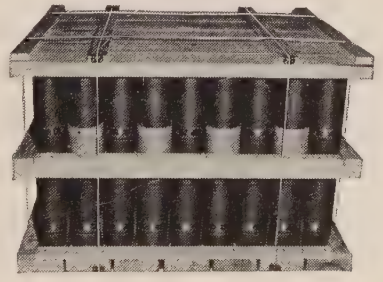

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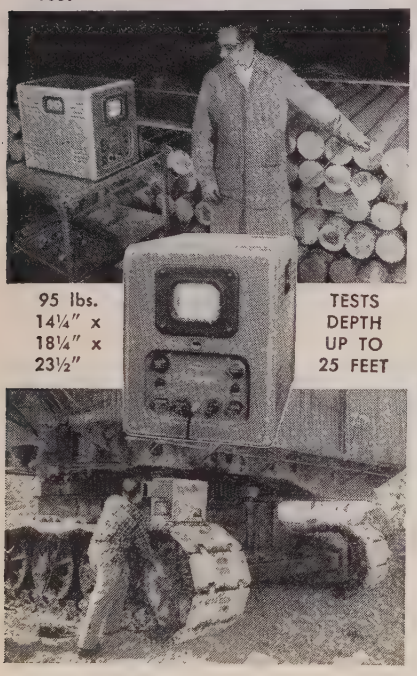

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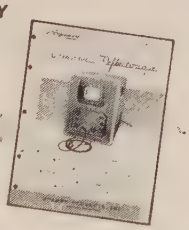

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lowest freight cost will set the pace for other district sellers.

The new price regulations are seen as effectively killing off gray market operations. However, gray market operators have been meeting increasing resistance from buyers for some time past, and especially since government curtailment orders forced cutbacks in consumer durable goods manufacture. Senate Committee hearing into gray market operations in this district is scheduled to open here Dec. 18.

Currently, demand on the warehouses is noticeably off. This reflects not only the curtailment in manufacture of civilian items due to government restrictions, but also the usual yearend policy of holding down inventories. Warehouse stocks have shown some improvement of late, especially the light, flat-rolled products, but bars continue scarce, especially large rounds, and so are plates and structurals.

Pittsburgh — District warehousemen say they have never been in a worse inventory position. All items are tight especially 8-in. and larger I-beams and wide flange beams. Mill shipments are disappointing. Distributors are digesting CPR-98 order readjusting prices after Dec. 16, 1951.

Philadelphia — While pressure has eased on sheets and odd lot miscellaneous steel, demand for plates, light structurals and bars out of warehouse remains heavy.

Los Angeles—Warehouse activity is off about 10 per cent. Distributors attribute the decline to yearend influences and expect a sharp increase in sales next month.

San Francisco — Chief interest in the warehouse market centers around new ceiling price regulation 98 as distributors seek to determine the effect of the order on their position in the market. One leading distributor says the new regulation will result in some small price reductions by a few sellers.

Seattle—Warehouse order volume would be double its present total were supplies more plentiful. Sellers are doubtful increased allotments next month will help much.

Scrap . . .

Scrap Prices, Page 164

Pittsburgh — District brokers say the scrap picture here is the worst it has been in years. It is reported one district plant is operating on a half-day inventory. Crucible Steel Co. of America says it may have to stop operation of one of its 13 furnaces at Midland, Pa. if inventory doesn't improve shortly. A U. S. Steel spokesman said last week they had been down to a three-day supply for weeks and if it gets any worse, they would have to curtail operations. Some brokers are operating three shifts in an effort to accelerate preparation and movement of in-transit scrap. One of Ohio River Steel Corp.'s four open hearths at its Toronto, O. works earmarked for repairs in the near future—was closed down ahead of time due to short scrap supply. It will remain down indefinitely.

Detroit—Two scrap sources on which NPA is pinning large hopes—auto wreckers and farms—are reported here to be pretty well cleaned out. Neither are believed failing to turn over their scrap as quickly as possible. Wreckers are now being permitted to burn cars between 3 and 6 p.m., which allows much faster turnover of yard stocks and minimizes hand labor operations. Auto plants report notable success with their drives, Packard announcing it has collected 2.5 million pounds of dormant material since July, and General Motors saying its take has been 62.9 million pounds. In the latest month GM collected 27.9 million pounds.

Philadelphia—Yard stocks of steel scrap are low following allocations to district mills badly in need of open-harth grades. Yet, due to high rate of operations, steel mill inventories are not building up substantially despite allocations.

Boston—Serious depletion of steel scrap inventories has resulted in heavier allocations to dealers including deliveries to Worcester with high priority given shipping orders. Demand for cast scrap lags with part of volume going to other areas.

Cleveland — Usual yearend lull in scrap market activity has set in. Mills are reclassifying more shipments, but are not rejecting any because they must accumulate reserves for winter use. The local scrap collection campaign is proceeding satisfactorily.

Cincinnati—Mills are unable to pile iron and steel scrap and lack of normal stocks will necessitate continued allocations. Collections are dwindling, and results from drives are not heavy enough to offset contra-trends. Recent railroad lists were light on rails, and rerollers are taking more of the available tonnage.

Chicago — Steelmaking scrap inventories shrink despite the fact allocations out of the district have halted. Average for the district is estimated at about one month's supply although the two plants of United States Steel have less than one week.

St. Louis — Scrap shipments and mill stockpiles continue to decline. Open hearths stocks are down to two weeks or less.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

960 tons, plant addition, Lectro-Metallurgical Co., St. John's, Oreg., to Bethlehem Pacific Coast Steel Corp., San Francisco.

500 tons, jig assembly plant, Boeing Airplane Co., Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

125 tons, third unit Seattle viaduct, to Pacific Car & Foundry Co., Seattle.

125 tons, classified government project, Washington state, to Pacific Car & Foundry Co., Seattle.

STRUCTURAL STEEL PENDING

1400 tons, (800 tons government-furnished) power and outlet tunnels, Palisades dam, Idaho; J. A. Tertelling & Sons, Boise, Idaho, low to Bureau of Reclamation, $1,242,700.

600 tons, Bonneville Power Administration office building, Portland, Oreg.; bid call expected in December.

125 tons, 242-foot truss bridge, Sutrana, Alaska; Sealand Construction Co., Seattle, low $280,000, to Alaska railroad.

120 tons, four I-beam bridges Valdez district, Alaska, for Alaska Road Commission; general award to J. J. Badraun, Seattle, low $219,625.

Unstated, steel for bus and towers, LaGrande power station; bids opened by Tacoma, Wash., Dec. 3.

Unstated, 28 sets stoplogs and other items, McNary dam; Gunderson Bros., Portland, Oreg.,

low $632,142, to U. S. Engineer, Walla Walla, Wash.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, third unit Seattle viaduct, to Bethlehem Pacific Coast Steel Corp., Seattle; MacRae Bros., Seattle, general contractors.

700 tons, oven foundry coke plant, United States Steel Co., to United States Steel Supply Co., Pittsburgh.

100 tons, bridges, traffic interchange, Longfellow bridge, Charles river, Boston to Truscon Steel Co., Boston; Munore-Langstroth Inc., Norwood, Mass., general contractor.

REINFORCING BARS PENDING

700 tons, Duquesne Light Co., Elrama, Pa.

550 tons, (225 tons government-furnished) intake and outlet structures, Lucky Peak dam; Hunt & Willette Inc., Wenatchee, Wash., low $396,610, to U. S. Engineer, Walla Walla, Wash.

550 tons, flood protection, Cumberland, Md.-Ridgeley, W. Va., Willis Creek channel improvement, section 1; bids Dec. 18, Corps of Engineers, Washington.

500 tons, Washington state railroad overcrossing, Snohomish county; rebids to Olympia, Dec. 11.

500 tons, estimated, Boeing Airplane Co. engineering office building, Seattle; bids Dec. 11.

285 tons, bridge, Beardstown, Ill.

220 tons, Chemical Warfare Department, Natrium, W. Va.

175 tons, Mazel House addition, Edgewater Hospital, Chicago.

155 tons, Cleveland Electric Illuminating Co., Cleveland.

130 tons, pumping station, Westchester, Ill.

125 tons, bridge over B. & O. railroad, Baltimore-Washington parkway, Prince Georges county, Maryland; bids Dec. 7, Bureau of Public Roads, Arlington, Va.

125 tons, redecking Washington state bridge, Pacific county; bids to Olympia, Dec. 18.

125 tons, two bridges Clackamas county, Oregon; bids to Bureau of Public Roads, Portland, Dec. 13 (steel government-furnished).

125 tons, highway bridge Blaine county, Idaho; Halvorson Construction Co., Boise, low $238,838, to Bureau of Public Roads.

100 tons, (80 per cent reinforcing) $237,000 disposal plant, Kennewick, Wash.; preliminary plans approved.

100 tons, 200-foot highway bridge Shoshone county, Idaho; bids to Bureau of Public Roads, Boise, Dec. 31.

100 tons, Scootenay pump plants, Columbia Basin project; Hunt & Willett Inc., Wenatchee, Wash., low $234,260.

100 tons, Linde Air Products Co., Ashtabula, O.

Unstated, general supply warehouse, Mt. Rainier, Wash., ordnance depot; plans ready, bids soon to U. S. Engineer, Seattle.

PLATES . . .

PLATES PENDING

6000 tons, (sheet piling government-furnished) cofferdam, Columbia river, initial phase of $10 million project, The Dalles, Oreg.; bids probably Jan. 22 to U. S. Engineer, Portland, Oreg.

100 tons or more, 500,000-gallon standpipe, Nashville, Tenn.; bids Nov. 27.

Unstated, tubular and cellular steel sheet piling, bulkhead and berthing facilities, Swan Island terminal; bids to Port of Portland, Portland, Oreg., Dec. 20.

PIPE . . .

CAST IRON PIPE PLACED

200 tons, Tacoma water system extension, to Pacific States Cast Iron Pipe Co., Provo, Utah; Paine & Gallucci, Seattle, low $137,400 general contractor.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Chesapeake & Ohio, 149 diesel-electric locomotive units, including: 27 three-unit 4500-hp freight locomotives, 7 three-unit 4500-hp freight and passenger locomotives, and ten 1200-hp switchers, to Electro-Motive Division, General Motors Corp., La Grange, Ill.; twenty-six 1600-hp heavy-duty road-switchers, to American Locomotive-General Electric Companies, Schenectady, N. Y.; eleven 1600-hp heavy-duty road-switching units to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

RAILROAD CARS PLACED

Missouri-Kansas-Texas, 25 fifty-ton flat cars; to its Denison, Texas., shops.

Wabash, 200 fifty-ton box cars, to American Car & Foundry Co., New York.

RAILROAD CARS PENDING

Transportation Corps, 965 forty-ton gondola cars, 386 tank cars of 10,000 gallon capacity each, 135 forty-ton refrigerator cars; bids due Dec. 11 on refrigerator cars and Dec. 12 on gondola and tank cars.

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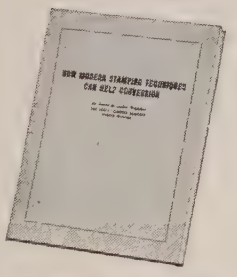

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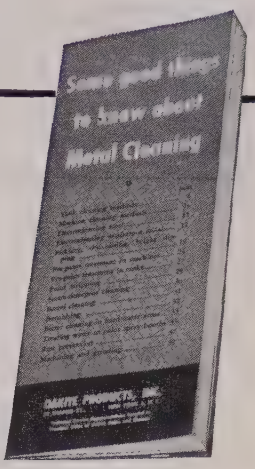

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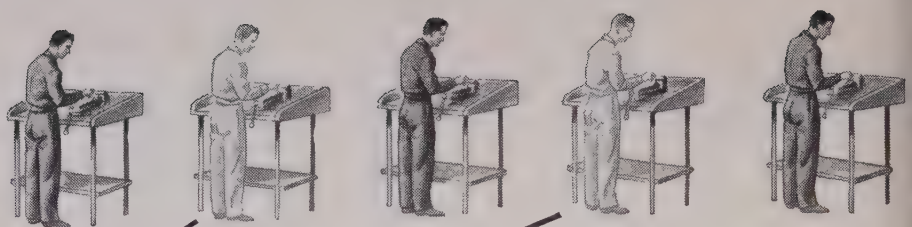

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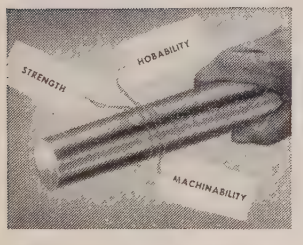
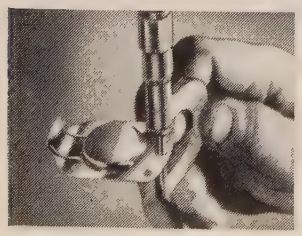
a way to free skilled manpower for other important jobs



Works better when the heat's on: "Give us a die casting die steel that fabricates easier and works better at elevated temperatures!" **A•E•S**ervice answered the need with Super Samson, the first die steel to combine good hobability, machinability and strength at high temperatures.

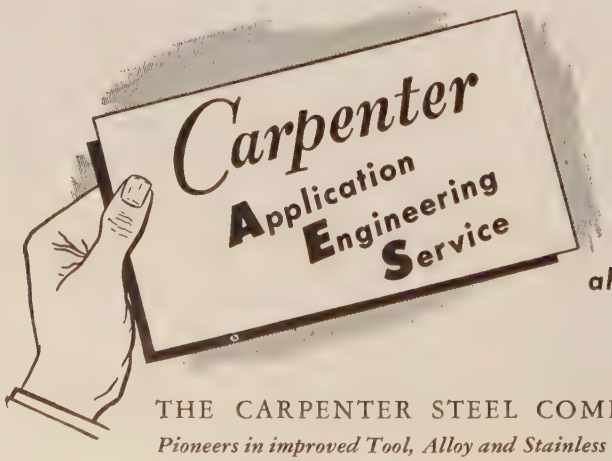


A closer fit with stainless: Few rejects, long tool life and high product quality result from stainless steel engineered to the job. To give Carpenter customers these advantages, **A•E•S**ervice came up with a new idea . . . Stainless *Servistrip*, providing closer hardness limits, better ductility, cleaner blanking.

Today many companies have found a way to use both manpower and equipment more effectively, through Carpenter's **A**pplication **E**ngineering **S**ervice.

A•E•Service is Carpenter's way of working alongside customers . . . helping them apply specialty steels to get maximum output from men and machinery. **A•E•S**ervice starts with the first bar labeled "Carpenter" you order. The bar is earmarked to do a specific service, like reducing production steps to free manpower, or making possible better products for more sales. That's why the Carpenter man probes *deeper* for facts on each job. He's after all the data he can get to apply the one steel best fitted to your needs. These goals represent a challenge we can't resist.

And **A•E•S**ervice is more. It's backed by field engineers rendering on-the-job service. It gets its vitality from a pioneering staff of laboratory specialists. These are the men responsible for many metallurgical "firsts" that have enabled Carpenter customers to be *first* with new products, and unusual, cost-saving methods. This is **A•E•S**ervice. Count on it to *continue* to work for those it serves.



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CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Knapp Develops New Metals

Two new metals which can reduce sharply the waste caused by sulphuric acid have been developed. After years of experimentation, Knapp Mills Inc., New York, offers Ferrolum and Cupralum.

Ferrolum is made by inseparably bonding lead and steel in such a way that the finished product combines lead's immunity to sulphuric acid with steel's strength. Cupralum is made by inseparably bonding lead and copper, retaining lead's acid resistance and copper's high electric conductivity and heat transfer value. Among their many applications, it is expected they will have widespread use throughout the nuclear industries to prevent the escape of harmful radiation. They also may have a profound effect on the many processes involving the rapid heating and cooling of acids because through the use of Cupralum it is possible to use freon instead of water directly in the coils. Use of Cupralum in the plating industry makes possible up to a 1000 per cent increase in the charge which passes from the anode through the electrolyte to the work.

Canadian Arsenals To Retool

Crown-owned arsenals in Canada soon will increase production to capacity levels on orders to provide $51.7 million worth of ammunition. Up until now, the government's arsenals in Quebec and Ontario have been producing mostly for foreign account. A few months of tooling up will be required to get the plants ready for the big contracts.

Bigelow-Liptak Moves Office

Bigelow-Liptak Corp., Detroit, celebrated its 25th anniversary by announcing its move to larger general offices at 2550 W. Grand Blvd., that city. Bigelow-Liptak designs are used widely to enclose boilers; for refinery heaters; coal, pulp and food dryers; metallurgical furnaces and glass tanks.

Aerol Co. Changes Hands

Aerol Co. Inc., Los Angeles, subsidiary of Lockheed Aircraft Corp., Burbank, Calif., was sold for $425,000 to a group of businessmen headed by Harry L. Oppenheimer, who became the firm's new president. Aerol manufactures casters, wheels and materials-handling equipment. George Heath is assistant treasurer; A. T. Gardiner, sales manager; L. J. Bauer, plant manager.

Machine & Die Firm Expands

Additional manufacturing space is being built by Shepherd Special Machine & Die Co., Cleveland. Included in the expansion program are new engineering and general offices.

Roe Tool & Die Organized

A business name was filed in the Erie county, New York, clerk's office for Roe Tool & Die, 85 Columbia, West Seneca, N. Y., by Charles Roe and Jack S. Lusby.

Tool Firm Erects Factory

Illinois Tool Works, Chicago, is building a factory on Algonquin road, that city. Estimated cost is $400,000.

More Power for Crucible

Steam power capacity at the Midland, Pa., Works of Crucible Steel Co. of America will be increased with the installation of two new boilers by Rust Engineering Co., Pittsburgh. The project will cost about $1,225,000. The new units will be housed in an addition being constructed at the No. 3 blast furnace boiler house.

National Wheel Builds Plant

National Wheel & Parts Mfg. Co., Bellwood, Ill., is building a $350,000 factory building in that city.

United Drill Gains Control

Control of J. H. Williams & Co., Buffalo—drop forgings and tools—passed to United Drill & Tool Corp., Chicago, which has increased its stock holdings in the Buffalo concern to 78 per cent of the total. No change in the company's management or policies is contemplated.

Cherry Rivet To Build Plant

Construction of a $1 million plant in Santa Ana, Calif., will be started immediately for Cherry Rivet Division, Townsend Co., New Brighton, Pa. Operations will be moved to the new plant from its present one in Los Angeles. The company manufactures rivets, bolts and other metal fasteners.

New Pattern Works Formed

A business name was filed in the Erie county, New York, clerk's office for Niagara Utica Pattern

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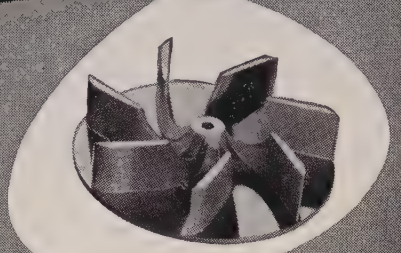

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Garrett Opens Phoenix Plant

Center core of an aircraft components plant, which can be expanded physically by 500 per cent if necessary, has been completed by Garrett Corp., Los Angeles, for its newest division, AiResearch Mfg. Co. of Arizona, Phoenix.

Thomas Opens Kansas Branch

Thomas Associates, Los Angeles, established a branch manufacturing plant at Coffeyville, Kans. The new plant will produce aluminum and steel clips, clamps and related items for aircraft and industrial customers. Ray Jordan will be plant superintendent.

Pittsburgh-Des Moines Steel

Address of Pittsburgh-Des Moines Steel Co.'s eastern sales office, opened recently in Newark, N. J., is 1060 Broad St. An incorrect address was reported to STEEL and published in the Dec. 3 issue.

Seattle Fabricator To Move

Standard Steel Fabricating Co. Inc. will move into a new plant at 8155 First Ave., Seattle, early in 1952. The new plant will be equipped for general steel fabricating.

Hercules Plans Nevada Plant

Hercules Powder Co., Wilmington, Del., plans construction of another plant for the manufacture of toxaphene at Henderson, Nev. The company will spend over $2.5 million for the added facilities. Construction of the new plant will start immediately.

General Box Moves Offices

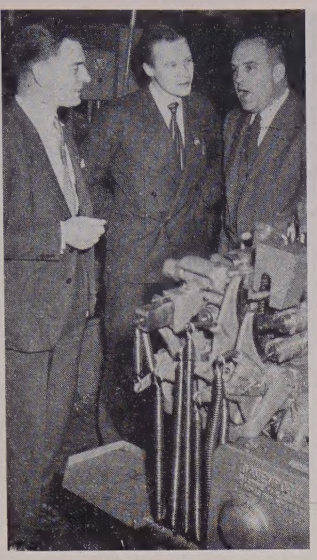
General Box Co. moved executive offices and laboratory from Chicago to a building near the intersection of Miner street and Busse highway, Des Plaines, Ill.

Franklin Mfg. Builds Plant

Franklin Mfg. Co., Providence, R. I., is constructing a $450,000 plant at Taunton, Mass., for fabrication of heavy steel products, including pontoon bridge parts, steel fence posts and metal case boxes. Company has a large contract for fence posts for the government to be fabricated of heavy strip steel.

Forms Canadian Subsidiary

After Jan. 1, Canadian business of American Air Filter Co. Inc., Louisville, will be handled by American Air Filter of Canada Ltd., Montreal, Que. William G. Hole, formerly of Darling Bros. Ltd., will be in charge of all Canadian operations. The company produces air filters, electronic precipitators, and dust collectors.



CLARITY BEGINS AT HOME: President H. Thomas Hallowell Jr. (left) of Standard Pressed Steel Co., Jenkintown, Pa., discusses refinements in production machinery with two men from SPS's British company, Unbrako Socket Screw Co. Ltd., Coventry. The Britons, Alfred J. Waldon, superintendent of the coventry plant, and W. H. Belcher, a supervisor on automatic screw machines, visited SPS under its policy of bringing management and supervisory representatives from foreign plants over for discussion of latest company machinery, procedures and thinking

Harrison Starts Expansion

Harrison Radiator Division, General Motors Corp., Lockport, N. Y., was issued a permit to build an addition to its West Lockport, N. Y., plant. The permit is for $1.4 million and work will begin at once. The new building will provide about 350,000 square feet of floor space.

Frasse Opens Syracuse Plant

Peter A. Frasse & Co. Inc., New York, opened its new plant and warehouse on Court Street road, Syracuse, N. Y. The firm is a steel distributor. John G. Bristol continues as district manager.

Elgin Machine Works Expands

Elgin Machine Works Inc., Elgin, Ill., awarded the general contract for erection of a $160,000 addition to its plant in that city.

Food Machinery Buys Firm

Food Machinery & Chemical Corp., San Jose, Calif., purchased Simplex Packaging Machinery Inc., Oak-

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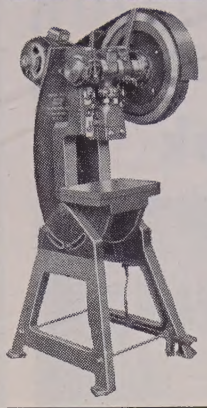

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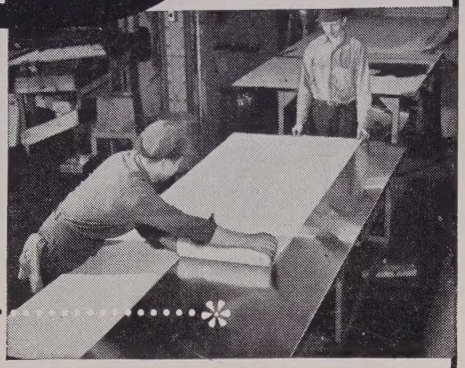

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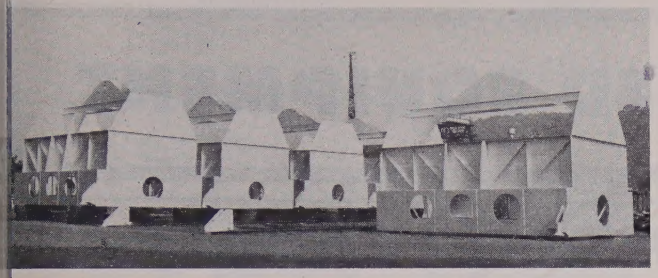

JUST AS HOT, COOLS FASTER: New type annealing covers that will provide more efficient, faster cooling through the use of a forced air flow between the outer and inner covers were fabricated for Jones & Laughlin Steel Corp.'s Aliquippa Works by Dravo Corp., Pittsburgh. Another advantage of the covers is that they give off heat over a shorter period of time than usual

land, Calif., manufacturer of bag-making and packaging machinery. The newly acquired company will be operated as an integral part of the parent corporation's Philadelphia subsidiary, Stokes & Smith Co. René Gaubert, founder of Simplex, will continue as resident manager of the West Coast operation.

Plans Carbon Black Plant

Cabot Carbon Co. of Canada Ltd. will start construction at once on a carbon black plant in Sarnia, Ont., to cost more than $2 million. Stone and Webster Canada Ltd. will do the construction work.

Engineering Firm Expanding

Lake Erie Engineering Corp., Buffalo, is spending about $1 million on an expansion program to handle increasing orders. Expansion includes plant additions, heavy machinery and a new engineering-design building now nearing completion.

Will Move Lighting Division

Canadian Westinghouse Co. Ltd. plans to move its lighting division from Hamilton, Ont., to Granby, Que. Manufacturing operations are scheduled to begin at a new plant there early next year. The plant will have 25,000 square feet of floor space.

Kist Machine Co. Organized

Kist Machine Co. Inc. was incorporated in Buffalo by Joseph Kist, Charles Ernst and Arthur G. Ernst.

Operates Depew Foundry

Warren Pell, who recently sold the Bison Industrial Supply, Buffalo, is operating Depew Foundry Corp., Depew, N. Y. It makes brass castings.

Automotive Fibres Expands

A $400,000 manufacturing plant at Orange, Calif., has been completed for National Automotive Fibres Inc., Detroit. Equipment is being installed and partial operations are scheduled to begin early in January.

Precision Design Expanding

Precision Design Co. leased space at 1413 Hertel Ave., Buffalo, for the designing of automatic machines.

Gunnison To Offer New Line

Gunnison Homes Inc., French Lick, Ind., the prefabricated housing subsidiary of United States Steel Corp., will place its 1952 product line into production Jan. 1 at its plant in New Albany, Ind.

Railway Plans Repair Shop

Canadian National Railways was granted a building permit to erect a large diesel locomotive repair shop in Fort Erie, Ont. The complete new shops will cost about $500,000, not including equipment.

Heat & Power To Expand

Heat & Power Corp., Baltimore, pipe fabricator and manufacturer of welded fittings, plans to expand its facilities to about 68,000 square feet compared with 20,000 square feet at present. John H. Zink is president.

Cleco Appoints Distributors

Cleco Division, Reed Roller Bit Co., Houston, appointed Cherokee Tool & Supply Co., Jacksonville, Tex.; Portable Tool Engineering Co., Detroit; and Universal Shellac & Supply Co., Brooklyn, N. Y., as distributors for Cleco air tools and accessories.

File Incorporation Papers

Charters of incorporation were filed in the state of Delaware by Paul Berry Inc., machinery; Pittsburgh Gear Co., gears, machinery, etc.; Vernon Engineering Inc., steel; Syntron Northern Illinois Sales Co., machinery. Corporation Trust Co., Wilmington, Del., is serving as the principal office of these companies.

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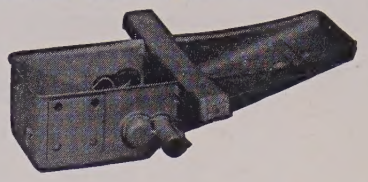

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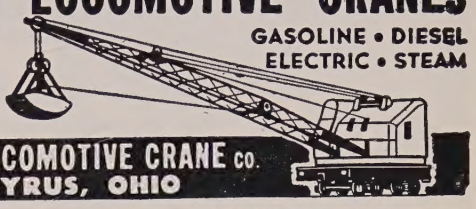

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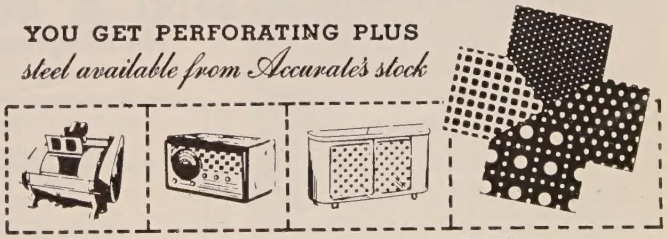

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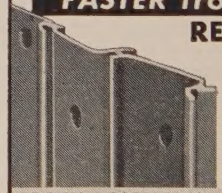

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